OCTOBER, 1955

Commercial Fertilizer

and PLANT FOOD INDUSTRY



Clear the track...

for the nitrogen that improves condition of mixed fertilizers

Some fertilizer producers consider ARCADIAN® URANA® Nitrogen Solutions their first and foremost aid to assure good physical condition in fertilizers. The reason is crystal clear. The usual mixed fertilizers contain ammonium chloride salts produced by reaction of ammonium salts with potassium chloride. These fern-like, or long, needle-shaped crystals tend to bind together, and may cause the fertilizer to cake at the factory and again in the bag. Use URANA 15 (15% urea), URANA 12 (12% urea), or URANA 10 (10% urea) in ammoniation, and the urea makes ammonium chloride form cube-shaped crystals that do not bind and cake. The result is well-cured fertilizer with less conditioning, and often a reduction in costs.

The right formulation of your fertilizers with our URANA, NITRANA® and U-A-S* Nitrogen Solutions is important in producing a better conditioned product. For details on other important aids to fertilizer production developed through Nitrogen Division research, consult one of our technical service representatives. Their help is available to customers at no cost.

Arcadian

PRODUCTS FOR PROFITABLE FARMING

Nitrogen Solutions (Nitrana® and Urana®)

American Nitrate of Soda

A-N-L® Nitrogen Fertilizer

Urea Products

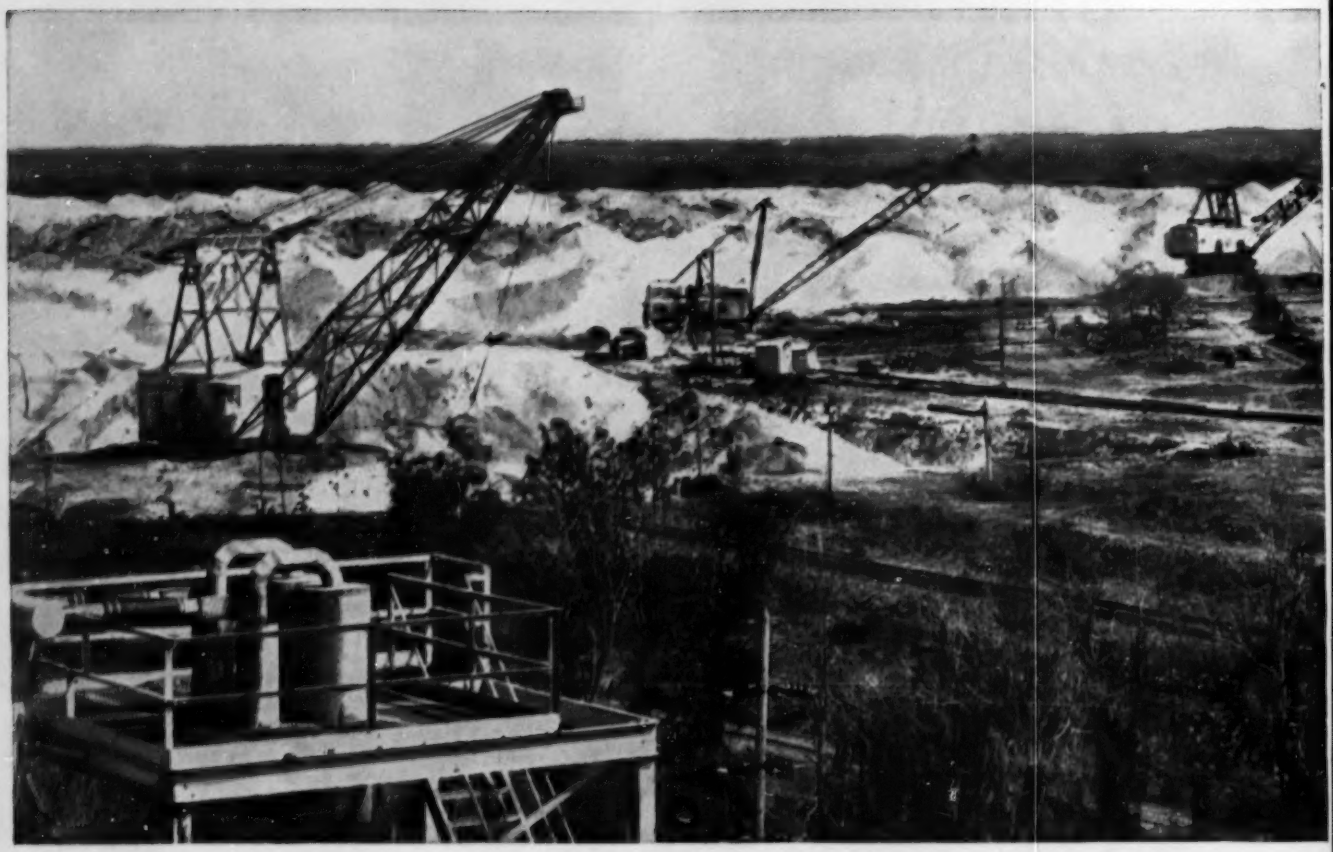
Sulphate of Ammonia

*Trade-mark

NITROGEN DIVISION Allied Chemical & Dye Corporation

New York 6, N. Y. • Hopewell, Va. • Ironton, Ohio • Indianapolis 20, Ind.
Atlanta 3, Ga. • Columbia 1, S. C. • Omaha 7, Neb. • Columbia, Mo.
Kalamazoo, Mich. • San Francisco 3, Cal. • Los Angeles 15, Cal.

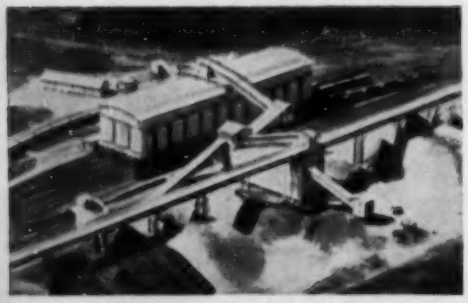
NITROGEN DIVISION ALLIED CHEMICAL



Three of the A.A.C. Co's electrically-operated draglines at work at our phosphate mines in Central Florida. Bucket capacities range from 9½ to 17 cubic yards. The 17-yard draglines with their 175-foot booms each weigh more than a million and a half pounds and can move 35,000 tons of material in 24 hours. From these rock deposits flow a continuous stream of high quality phosphate rock, assuring a dependable source of supply of AA QUALITY phosphorus products, see list below.

AA Quality...

for over 85 years a symbol of quality and reliability



From the air—wet rock storage and drying plant, with dry rock storage silos in background. These silos, 29 in number, have a total capacity of 40,000 tons of dried rock. Under the silos are four runways where 40 railroad cars can be loaded at a time.

principal AA QUALITY products

All grades of Florida Pebble Phosphate Rock
AA QUALITY Ground Phosphate Rock
All grades of Complete Fertilizers **Superphosphate**
Gelatin **Bone Products** **Salt Cake** **Ammonium Carbonate**
Sulphuric Acid **Fluosilicates** **Insecticides and Fungicides**
Phosphoric Acid and Phosphates
Phosphorus and Compounds of Phosphorus

THE AMERICAN AGRICULTURAL CHEMICAL COMPANY

GENERAL OFFICE: 50 CHURCH STREET, NEW YORK 7, N. Y.

30 FACTORIES AND SALES OFFICES, SERVING U.S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE

YOU Increase



When Lion

- A Leader in Petro-Chemicals -

Supplies Your NITROGEN NEEDS

HERE'S THE LION LINE-UP OF QUALITY NITROGEN FERTILIZER MATERIALS

Lion Anhydrous Ammonia—82.2% nitrogen. Quality guaranteed.

Lion Aqua Ammonia—Ammonia content about 30%—other grades to suit your requirements.

Lion Ammonium Nitrate Fertilizer—Improved spherical pellets. Guaranteed 33.5% nitrogen.

Lion Nitrogen Fertilizer Solutions—Various types to suit your particular manufacturing needs.

Lion Sulphate of Ammonia—White, uniform, free flowing crystals. Guaranteed 21% nitrogen.

Now that the new fertilizer manufacturing season is in full swing, make sure you realize all the profits your plant can produce. *Where you buy* your raw materials can be vital and now, more than ever before, it pays to buy *your nitrogen needs* from Lion—a leader!

Lion nitrogen products are manufactured under rigid controls to meet exacting specifications—ending the costly production delays that result when ingredients vary in quality from day to day. With Lion products, you produce with maximum efficiency and profit—and you maintain the quality standards your customers demand.

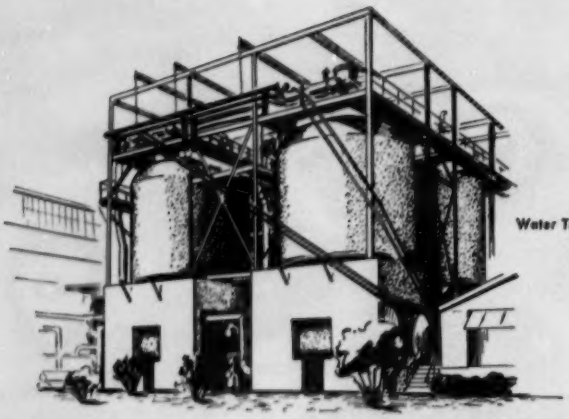
Lion also provides an expert technical staff to assist you in solving difficult formulation and processing problems. And, throughout the year, Lion's sales building advertising tells farmers the plant food story—for your benefit. Lion's leadership in customer service stands out, offering you outstanding opportunities for increased profits—and your best season yet!

DISTRICT SALES OFFICES: NATIONAL BANK OF COMMERCE BUILDING, New Orleans, La. • SHEPHERD BUILDING, Montgomery, Ala.

LION OIL COMPANY

CHEMICAL SALES DIVISION — **EL DORADO, ARKANSAS**

LION



Water Treating Plant

Crude Sulphur

for Industrial Use

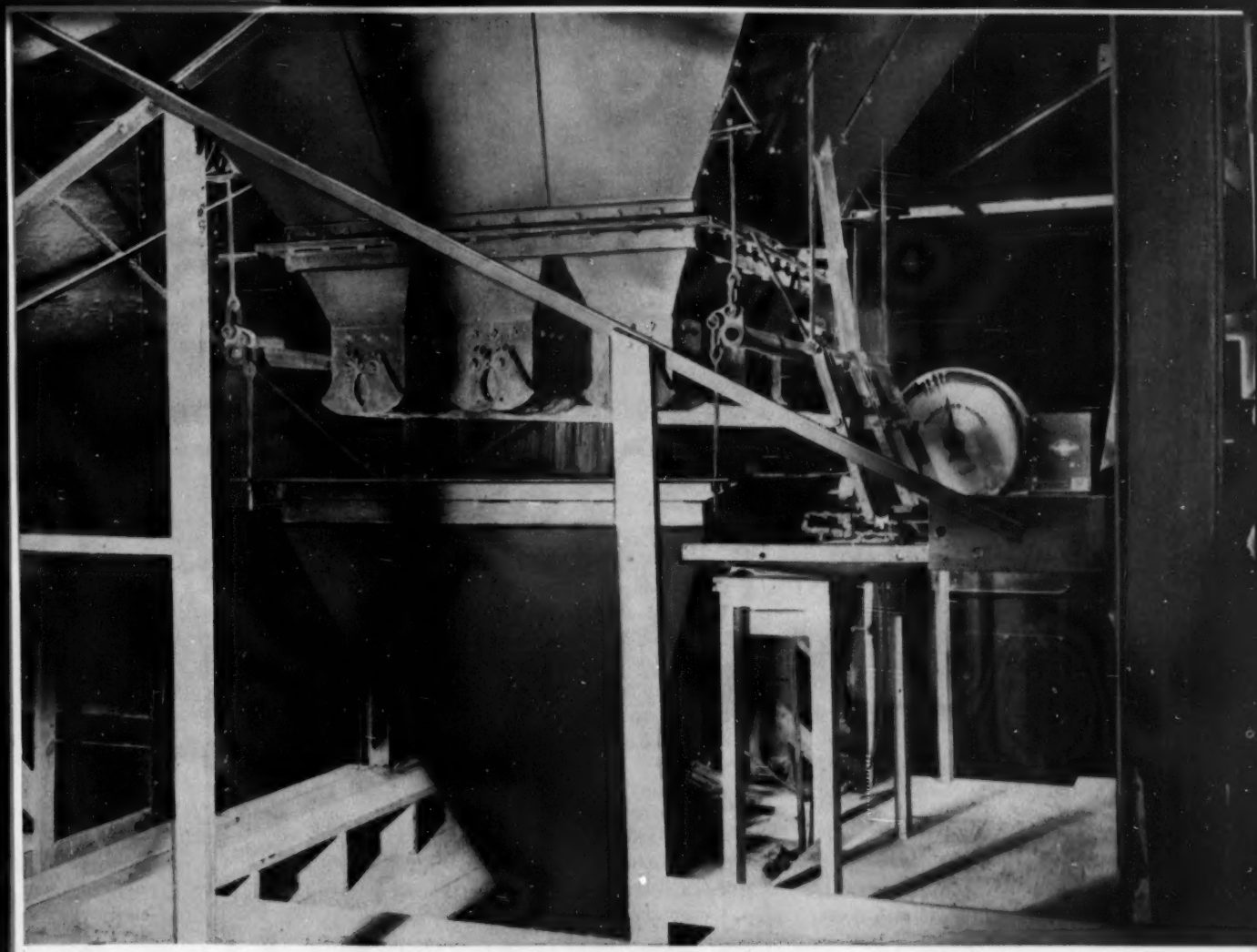
from the properties of

Texas Gulf Sulphur Co.

75 East 45th Street • New York 17, N. Y.

Producing Units

- **NEWGULF, TEXAS**
- **MOSS BLUFF, TEXAS**
- **SPINDLETOP, TEXAS**
- **WORLAND, WYOMING**



FERTILIZER PLANTS and EQUIPMENT

Whether you are interested in building a new fertilizer plant, or modernizing your present facilities, you will profit by consulting DAVIDSON-KENNEDY COMPANY. A competent staff with broad, practical experience stands ready to assist you with your particular problem, or to offer complete turnkey service on a new plant. DAVIDSON-KENNEDY engineers will supervise installation and upon completion will train personnel in the operation of D-K equipment. Call DAVIDSON-KENNEDY COMPANY and discuss your plans. You will profit from it.

COMPLETE FERTILIZER PLANTS / FERTILIZER MIXING PLANTS

Acid Plants / Acidulating Plants / Mixing Units / Granulating Plants / Batching Systems (in line and cluster hoppers) / Continuous Ammoniating Plants

DAVIDSON-KENNEDY CO.

1090 Jefferson Street, N.W. Atlanta, Georgia, U. S. A.

Published by
WALTER W. BROWN
PUBLISHING CO., INC.
75 Third St., N. W., Atlanta 8, Georgia
Phone Atwood 4160

President
ERNEST H. ABERNETHY

Editor
BRUCE MORAN

Managing Editor
CLAY W. PENICK, JR.

Business Manager
V. T. CRENSHAW

Chicago Representative
ELON A. ABERNETHY
1200 N. Ashland Ave.—Room 544
Phone CApitol 7-4111

West Coast Representative
M. A. CALDWELL
2267 W. 24th St., Los Angeles, Cal.
Phone REPUBLIC 1-3050

Address all correspondence to Atlanta Publishing Offices, sending direct to COMMERCIAL FERTILIZER and PLANT FOOD INDUSTRY, 75 Third St., N. W., Atlanta 8, Georgia.
Published Monthly by

Vol. 91 No. 4 *Established 1910* October, 1955

Commercial Fertilizer
and PLANT FOOD INDUSTRY

Subscription rates: United States, $3.00 per year; 5 years, $12.00. Foreign $5.00 per year.

Contents

Commenting Freely, by *Bruce Moran* 6
Just Around the Corner, by *Vernon Mount* 10
Control Officials Meet—Staff Pictures 19
Minimizing Mix Cost, by *Earl R. Swanson* 23
CFA Convention Program 25
Potash in the Midwest, by *Werner L. Nelson* 26
Research Results & Reports 30
SAFETY
First Aid Equipment, by *Frank Crane* 32
Safety Record Winners 34
Markets and Staff Tonnage Reports 36
Crop Chemicals 38
V-C Celebrates 60th Anniversary 40
Around the Map 40
Personals 48
Obituaries 50
Biloxi Conference Program 52
Industry Calendar 54
Classified Advertising 59
Index to Advertisers 64

COMMERCIAL FERTILIZER and PLANT FOOD INDUSTRY, entered as second class matter, October 12, 1910, at the post office at Atlanta, under the Act of March 3, 1879. Published monthly except semi-monthly in September, by Walter W. Brown Publishing Co., Inc., 75 Third St., N. W., Atlanta 8, Georgia.

Commenting Freely

by BRUCE MORAN

A lot of major things are happening in agriculture, politically and in the field of research. But let us stop for a moment to consider what may seem of importance only to local home-town areas, and with little bearing on the manufacture and sale of plant food. I refer to the 8-year old program through which the 5,000 local Granges undertake to build better communities out of their own home towns—with the slogan "Evaluate, then elevate your community".

The reason this can be important to our industry is that a proud farmer is a good farmer, and a good farmer feeds his crops well so he can feed his family well. The more real, honest community pride, the more fertilizer is sold in that area. I believe you could prove that mathematically, if you could think of a way to put community pride on a graph.

So, aside from the fact that it is smart to cooperate with the National Grange anyhow, it would be very smart if fertilizer people were to cooperate as fully as possible with this movement, and with the estimated 250,000 men, women and youngsters who are out to build themselves a happy, prosperous and satisfying environment in which to live.

What do we know about your business?

When you have Fertilizer Plant needs



Extensive research and investigation of *all* the facts are necessary to make the building of a fertilizer plant economically sound. Many years of experience in the fertilizer industry have made Harte engineers cognizant of the over-all picture to be considered in fertilizer plant design. Realizing that certain fundamentals must be followed while specializing the design of each plant, all possible facts are studied and adapted to produce a sound, enduring investment.

If you plan to build a fertilizer mixing plant, or an associated plant, the Harte organization of specialists can handle your complete job or any part, from original design to operating plant. Under the Harte System all steps — site study, planning, architectural, engineering, purchasing, construction management — are integrated, assuring smooth-working continuity. Assuring a saving in time and money. In fertilizer plant planning there's no substitute for experience. Call in the Harte organization for a discussion of your plans. There's no obligation.

JOHN J. HARTE COMPANY | ENGINEERS CONSTRUCTION MANAGERS

SPECIALISTS IN THE FOLLOWING PROCESSES: • Solvent Extraction Systems • Sulphuric Acid • Vitamin Recovery • Synthetic Detergents • Insecticide Plants • Clay Processing [redacted] • Paper Mills • Electrolytic De-Tinning • Lime and Cement • Rubber Products • Glass • Explosives • Petrochemicals • Food Canning Plants • Cotton Mills • Industrial Warehousing • Steam Generating & Power Plants • Milk By-Products • Naphthalene & Tar Plants

284 TECHWOOD DRIVE, N. W., ATLANTA • NEW YORK • HOUSTON • MEXICO, D. F. • HAVANA • WASHINGTON, D. C.

more and more
granulated
fertilizer manufacturers
are turning to
LOUISVILLE rotary dryers
rotary coolers
to speed production ... reduce drying costs



Installations are individually engineered for your problems. Results can be pre-determined in our pilot plant. We'll be glad to show you how the fertilizer industry has found a new way to efficient and profitable drying.

A Louisville engineer will survey your present operation without obligation on your part. Take advantage of Louisville's equipment and experience. Phone or write today.

Over 50 years of creative drying engineering

GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer Sales Office: 380 Madison Avenue, New York 17, New York
139 South Fourth Street, Louisville 2, Kentucky
General Offices: 135 South LaSalle Street, Chicago 90, Illinois
In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario
Offices in all principal cities

ATTENTION FERTILIZER MANUFACTURERS:

NOW YOU CAN USE UREAFORM IN YOUR MIXES!

UREAFORM NITROGEN DOES NOT LEACH

USE IT IN YOUR . . .



USE UREAFORM INSTEAD OF ORGANIC NITROGEN IN YOUR HI-ANALYSIS FERTILIZERS!

AVAILABLE FOR THE 1ST TIME IN COMMERCIAL LOTS! REPLACES NATURAL ORGANIC NITROGEN AT THE SAME COST OR LESS PER UNIT . . . LASTS 3 TO 4 TIMES LONGER

NOW, for the first time, Ureaform Nitrogen is available to all fertilizer manufacturers in commercial quantities. This new, long-feeding nitrogen will modernize your product, make it competitive with the best, and yet cost no more. It's completely safe, non-burning, sanitary, odorless and feeds nitrogen evenly through a whole season — selling points that your customers will appreciate.

COMPARE THE COST:

UREAFORM NITROGEN	NATURAL NITROGEN
$6 to $7	**$6 to $9**
PER UNIT	PER UNIT

UREAFORM MAKES A BETTER FERTILIZER BECAUSE IT IS NON-LEACHING AND FEEDS LONGER!

GET THE FULL FACTS AND PRICES . . .
PHONE, WIRE OR WRITE

NITROFORM

AGRICULTURAL CHEMICALS DIVISION
WOONSOCKET COLOR & CHEMICAL CO.
92 Sunnyside Ave. Woonsocket, R. I.

JUST AROUND THE CORNER *by Vernon Mount*

THINGS CHANGED FAST when the President's thrombosis laid him low. As I said last month "We were all of us wrong in 1948". The whole theme of politics is changed, and the outlook is nowhere near "more of the same for the next 4 years". With the President highly unlikely to run again, the field is wide open on both sides of the house...and plenty of men will be busy running.

CONFIDENCE need not be shaken in the present Administration. It has not ever been a one-man deal. Eisenhower is a team-man, a developer of organization. The team is there now--the same men who shaped policies, formulated decisions, made many decisions--and working as it has right along. It will continue to work. The only difference is that the team will be more evident. Once people realize this they will settle back and relax.

BUT THE POLITICIANS WON'T!

Yours faithfully,

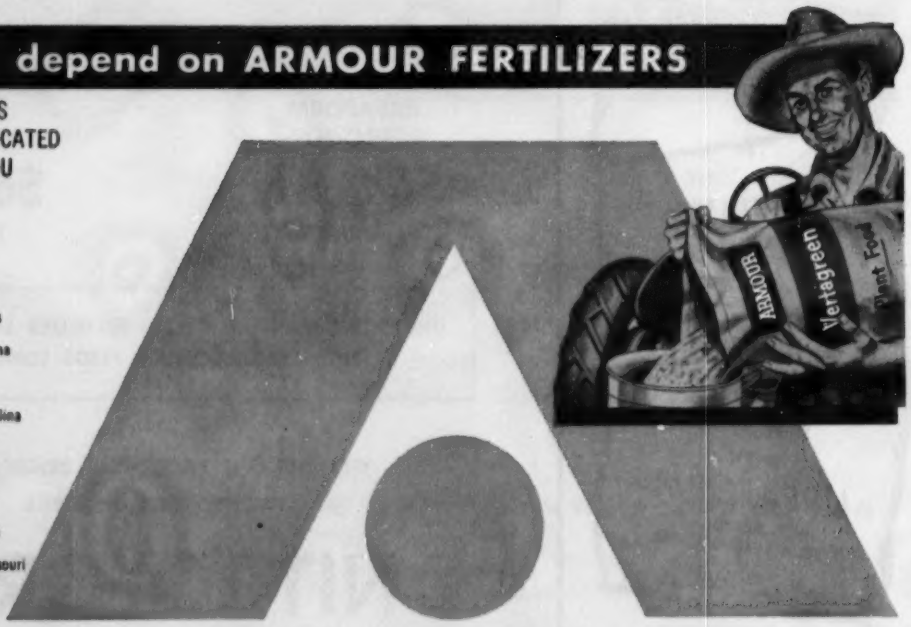
Vernon Mount

Farmers depend on ARMOUR FERTILIZERS

31 FACTORIES
CONVENIENTLY LOCATED
TO SERVE YOU

Albany, Georgia
Atlanta, Georgia
Augusta, Georgia
Baltimore, Maryland
Barlow, Florida
Birmingham, Alabama
Carteret, New Jersey
Chicago Heights, Illinois
Cincinnati, Ohio
Columbia, South Carolina
Columbus, Georgia
Dallas, Texas
East St. Louis, Illinois
Greensboro, North Carolina
Houston, Texas
Jacksonville, Florida
Jeffersonville, Indiana
Memphis, Tennessee
Montgomery, Alabama
Nashville, Tennessee
New Orleans, Louisiana
Norfolk, Virginia
North Kansas City, Missouri
Presque Isle, Maine
Sandusky, Ohio
Sigio, Tennessee
Waterloo, Iowa
Wilmington, North Carolina
Winona, Minnesota

Also sales offices in Havana, Cuba, and San Juan, Puerto Rico



ARMOUR FERTILIZER WORKS
General Office, P. O. Box 1685, Atlanta 1, Georgia



"A Short Horse Is Soon Curried"

In Albemarle's completely integrated Multiwall operation small orders look as "well groomed", receive as careful attention as the big jobs. Color printing? Colored Kraft? "A horse of another color"... but they are Albemarle specialties too.

FOR *Multiwall* CALL **Albemarle**



ALBEMARLE PAPER MANUFACTURING COMPANY • RICHMOND, VIRGINIA

EASTERN SALES OFFICE: NEW YORK CITY • SOUTHERN SALES OFFICE: BALTIMORE, MD. • MIDWEST SALES OFFICE: CHICAGO, ILLINOIS



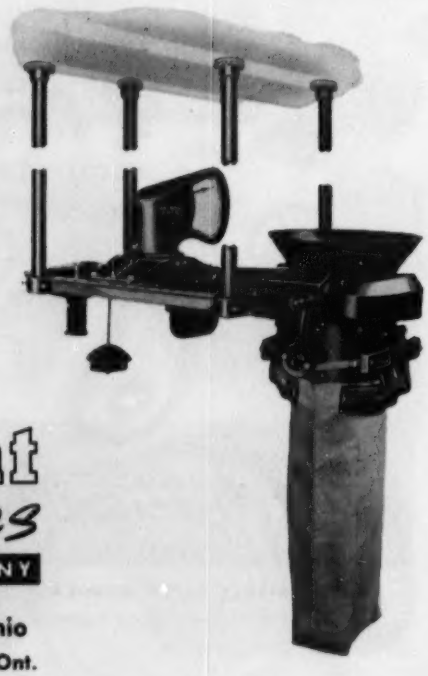
EXACT WEIGHT
High-speed Sacking Scales

Model No. 1120 is a dependable heavy duty scale for manual sacking and checkweighing fertilizers. Short lever fall plus the action of an adjustable damping device bring indicator to rest quickly, and magnified indication makes possible an accurate reading at a glance. Tower revolves to any reading position. Weighing platform is only 6½ inches from floor—minimizes lifting of containers. Open construction permits easy cleaning. Weighs accurately in out-of-level position.

EXACT WEIGHT Sacking Scales

Save Time, Product, Profit!

Sack, weigh, and visibly checkweigh in ONE operation! One simple operation does the work of three. Available in five different models for varied installations Model 2229, shown, is designed for ceiling suspension. Write for complete information.



Sales and Service from Coast to Coast



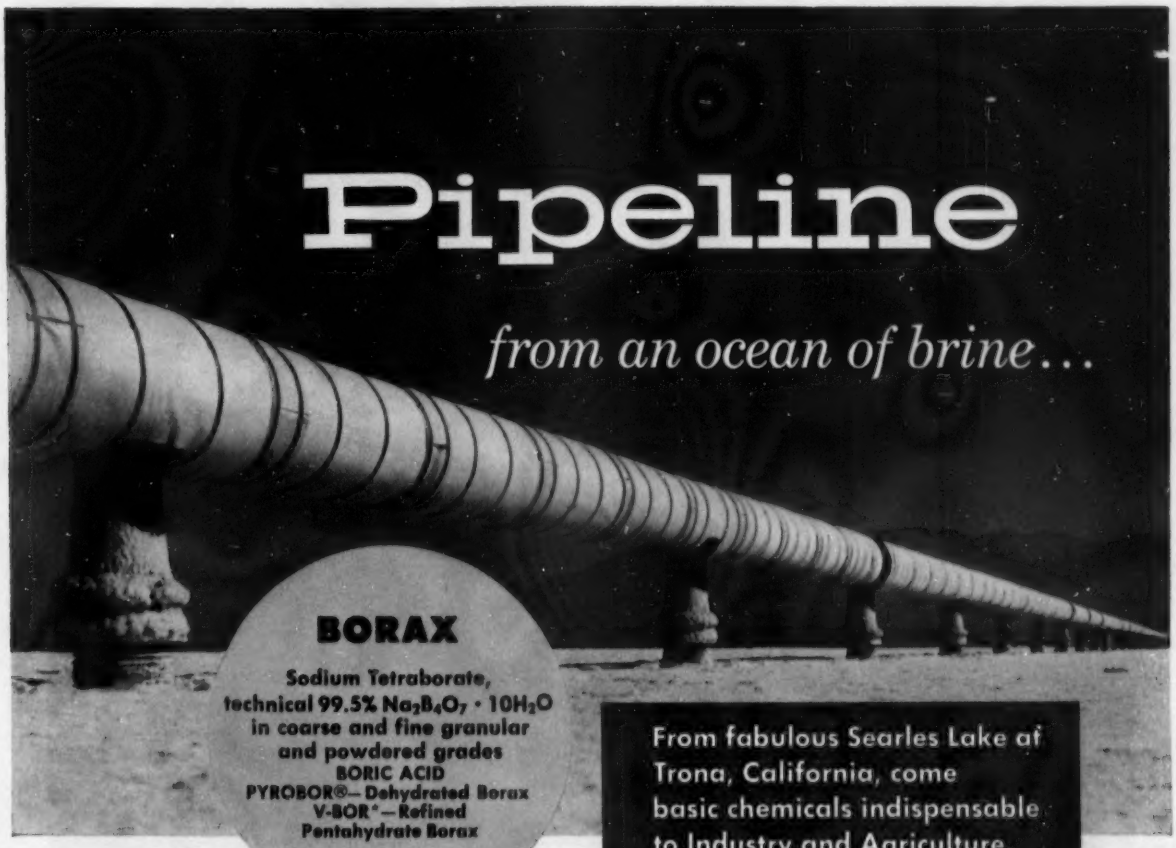
Exact Weight Scales

Better quality control
Better cost control

THE EXACT WEIGHT SCALE COMPANY

906 W. Fifth Avenue, Columbus 8, Ohio

In Canada: P. O. Box 179, Station S, Toronto 18, Ont.



Pipeline

from an ocean of brine...

BORAX

Sodium Tetraborate, technical 99.5% $Na_2B_4O_7 \cdot 10H_2O$ in coarse and fine granular and powdered grades
BORIC ACID
PYROBOR®—Dehydrated Borax
V-BOR*—Refined Pentahydrate Borax

From fabulous Searles Lake at Trona, California, come basic chemicals indispensable to Industry and Agriculture.

POTASH

Agricultural Muriate 95-98% KCl, Chemical Muriate 99.5% KCl, and Sulphate 95-98% K_2SO_4

American Potash & Chemical Corporation

TRONA INDUSTRIAL AND AGRICULTURAL CHEMICALS

Offices:	3030 West Sixth Street, Los Angeles 54, California 99 Park Avenue, New York 16, New York 214 Walton Building, Atlanta 3, Georgia
Export Division	99 Park Avenue, New York 16, New York
Plants	Trona and Los Angeles, California; San Antonio, Texas

SODA ASH

Sodium Carbonate, technical 99.2% Na_2CO_3 58% Na_2O in granular and fine granular grades

LITHIUM

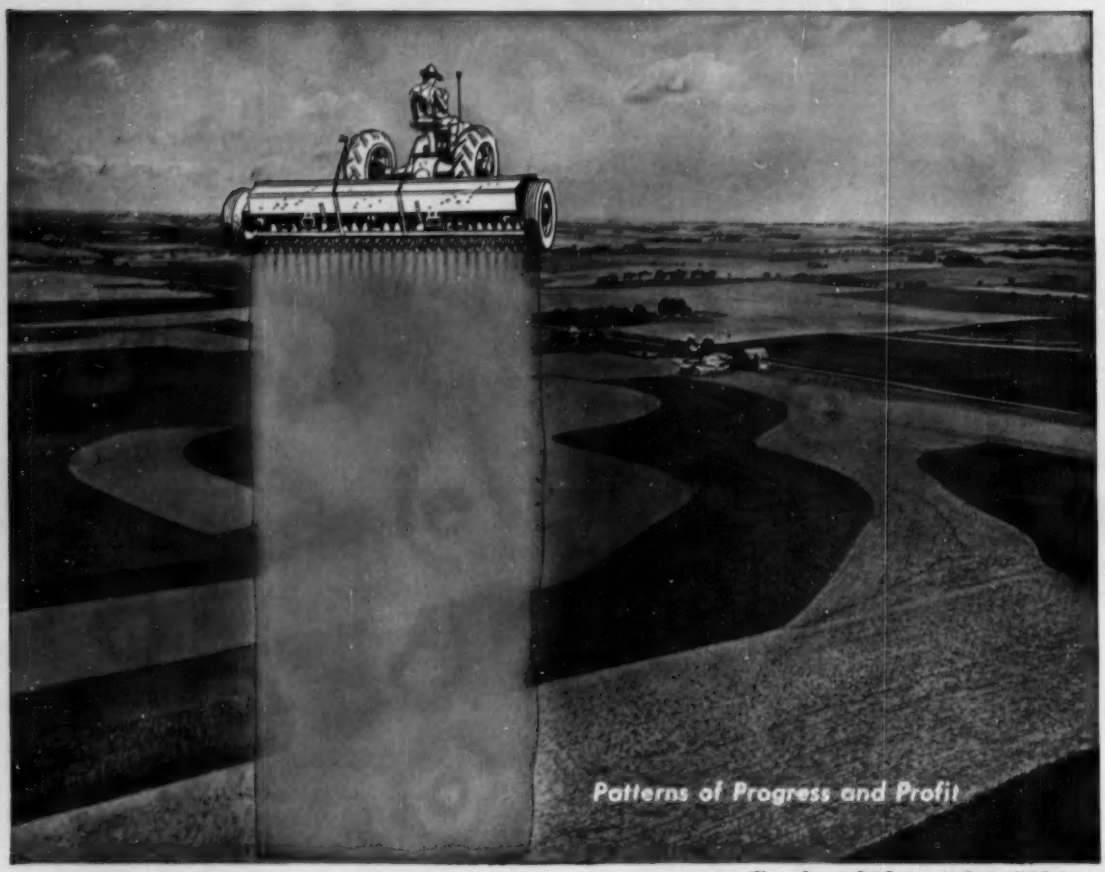
Lithium Carbonate, Lithium Chemicals, Lithium Ores

SALT CAKE

Sodium Sulphate Anhydrous, 97.0% Na_2SO_4 minimum, in regular and industrial grades

*Trade Mark AP&CC

Producers also of—BROMINE CHEMICALS, and a diversified line of specialized agricultural, refrigerant and industrial chemicals



(Photo—Courtesy Soil Conservation Service, U.S.D.A.)

High Grade Muriate of Potash

by DUVAL

Duval Muriate of Potash ranks high as one of the essential nutrients which greatly increase yield and profits in crop production.

DUVAL SULPHUR and POTASH CO.
Modern Plant and Refinery at Carlsbad, New Mexico

Address all communications to:
ASHCRAFT-WILKINSON CO.
Exclusive Distributors
ATLANTA, GEORGIA
Cable Address: Ashcraft

NORFOLK, VA. • CHARLESTON, S. C. • TAMPA, FLA. • JACKSON, MISS. • COLUMBUS, OHIO • DES MOINES, IOWA

NOW at NO EXTRA COST!

"ARKSAFE" MULTIWALL BAGS with ALL-TEMP LAMINANT



. . . provide
MOISTURE PROTECTION
over greater
TEMPERATURE RANGE!

"ARKSAFE"
ALL-TEMP LAMINANT
DOES THE JOB!

You never lose the protection of the moisture-proof ply in "Arksafe" Multiwall Bags made with ALL-TEMP LAMINANT.

It remains flexible in cold climates . . . doesn't crack to allow moisture penetration . . . doesn't bleed in warm weather.

ALL-TEMP LAMINANT makes bags easier to handle and sew and COSTS NO MORE than ordinary asphalt barriers.

ALL-TEMP LAMINANT is plasticized asphalt developed by the ARKELL SAFETY BAG COMPANY —leaders in the development of better packaging for industry since 1896.

ARKELL SAFETY BAG COMPANY

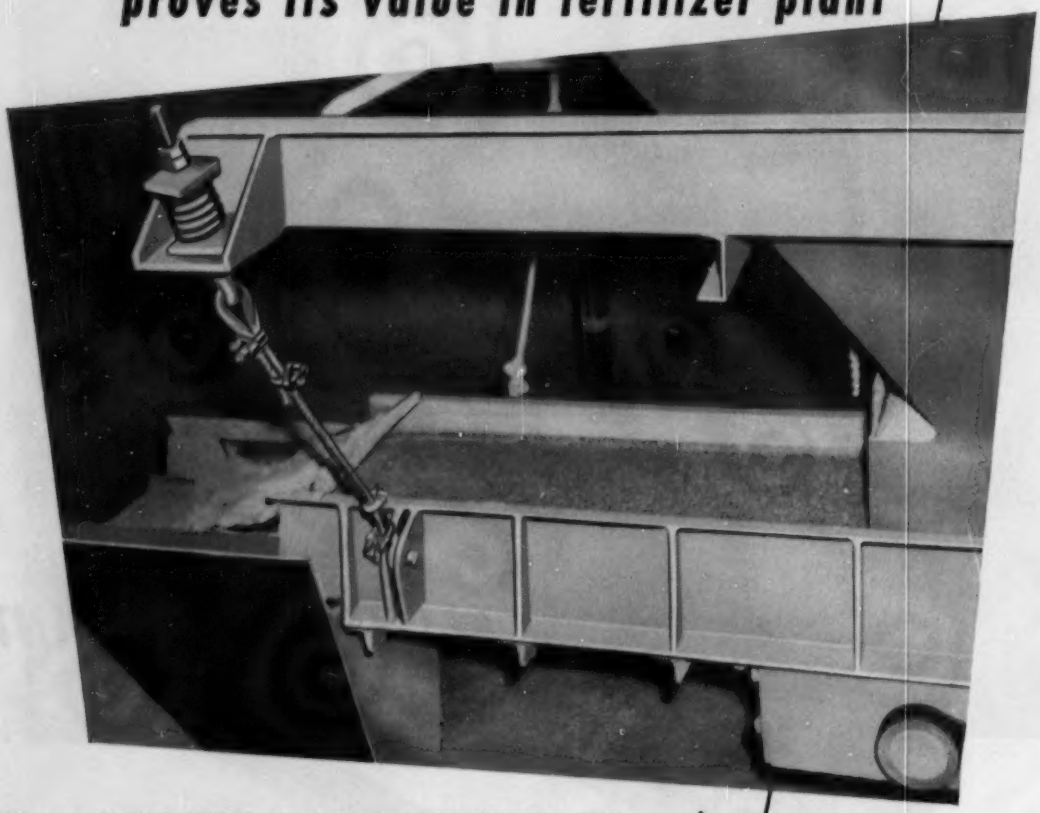
10 EAST 40th STREET, NEW YORK 16, N. Y. 6845 WEST 65th STREET, CHICAGO 38, ILL.

Plants: Chicago, Illinois • Newport News, Virginia

SIMPLICITY

OS-A-VEYOR FEEDER

proves its value in fertilizer plant



Wisconsin FARMCO SERVICE Cooperative is utilizing this 18" x 6' Simplicity Os-A-Veyor Feeder to feed finished fertilizer from a bin to a bagger. The bagger is operating at 14 bags per minute. The rate of feed is controlled by a gate on the bin.

Simplicity Os-A-Veyor Feeders are designed to handle heavy column loads. They feed along their entire length and allow for the use of a larger bin . . . thus eliminating the problem of material bridging in the bin. Simplicity Feeders may be suspended with spring and cable arrangement from the bin above as shown in the picture, or may be spring mounted. They will feed on the horizontal, as pictured . . . thus requiring less headroom. They feature replaceable liners and can be provided with grizzly or screen sections, one or two decks, and can be totally enclosed. If a screening or feeding problem exists in your fertilizer plant, call on a Simplicity sales representative and find out about Simplicity units, now in wide use throughout the fertilizer industry.



Pictured here is a 2' x 5'6" Model JA Os-A-Veyor Feeder

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND 3, MICH.

SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.
FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario
FOR EXPORT: Brown and Sites, 50 Church St., New York 7, N. Y.

160

FROM THE WORLD'S STOCKPILES—TO YOUR PLANT...

Woodward & Dickerson Inc. serves you with an 80 year reputation for reliability in quality, price and delivery.

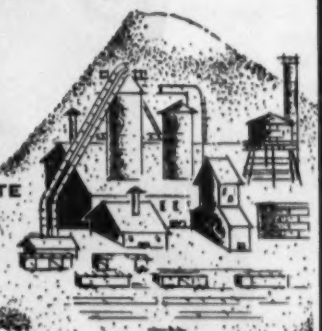
POTASH

MURIATE
SULPHATE
NITRATE

NITROGEN

SULPHATE OF AMMONIA
AMMONIUM NITRATE
CALCIUM AMMONIUM NITRATE
UREA

AND ALL OTHER **FERTILIZER** AND **FEED MATERIALS**



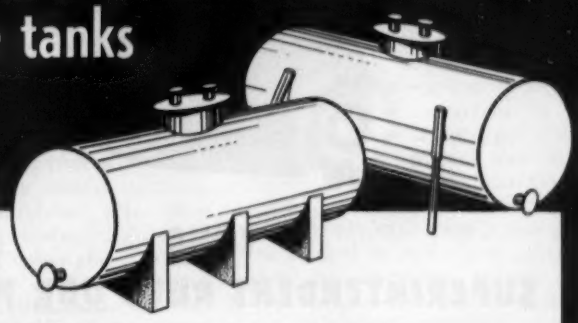
ESTABLISHED 1873

Woodward & Dickerson Inc.

1400 SOUTH PENN SQUARE, PHILADELPHIA 2, PA., U.S.A.
TELEPHONE: LOcust 4-5600 Cable Address: "Woodward" TELETYPE: PH109

Branches in MADRID, MANILA, TOKYO, SEOUL, WASHINGTON, D.C., U.S.A.

Delivery in less than 30 days on these low-cost, dual-purpose tanks



Solve liquid fertilizer storage problems quickly, economically and efficiently. A&C rubber-lined tanks are ready for prompt delivery. They assure complete corrosion protection from both phosphoric acid and nitrogen solutions . . . cost far less than any other type of dual-purpose tank. Send coupon for complete information today!

Abrasion & Corrosion Engineering Company

Abrasion and Corrosion Engineering Company
P. O. Box 3568, Amarillo, Texas

Gentlemen:

Without obligation, please send me complete information on low-cost A&C rubber-lined tanks.

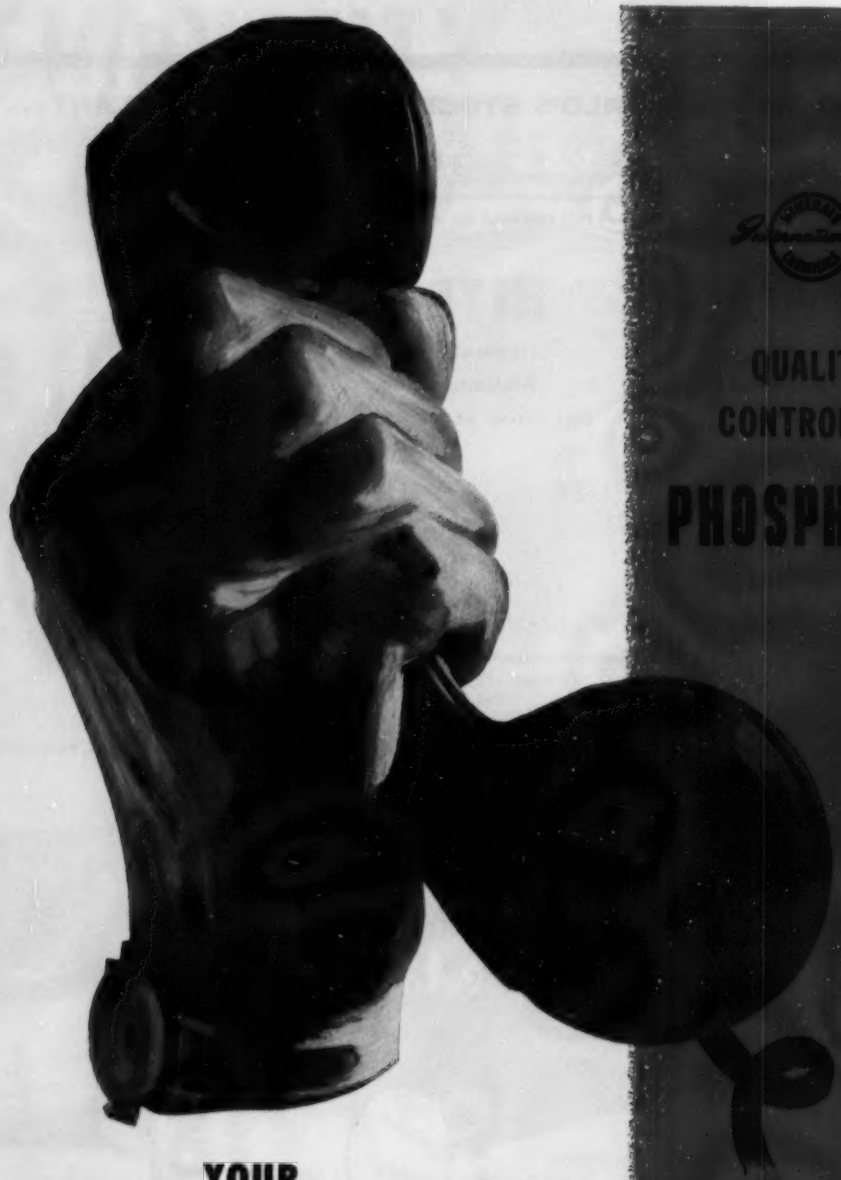
Name_____

Company_____

Address_____

City_____ Zone____ State_____

P. O. BOX 3568 AMARILLO, TEXAS



QUALITY
CONTROLLED
PHOSPHATES

FOR INDUSTRY
AND AGRICULTURE

- for the manufacture of complete fertilizers,
- for the manufacture of industrial chemicals,
- ground rock phosphate for direct application to the soil.

YOUR
SUPERINTENDENT RUNS OUR PLANTS

He and many like him call the tune and we deliver. Your superintendent has all this at his command. Huge production at six mines and plants with large, modern facilities. Enormous storage capacity. A full range of grades of *quality-controlled* phosphates. Really "hot" traffic service by rail or vessel that gets your regular or emergency orders delivered on time.

Visit our Florida Phosphate Operations. You'll see the result of nearly 50 years of research and development in mining and refining methods. You'll see plants built in anticipation of the expansion of fertilizer demand. You'll see a great team of production people. Then you'll know why it's good business to depend on *International* for phosphates.

PHOSPHATE MINERALS DIVISION

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

GENERAL OFFICES: 20 N. WACKER DR., CHICAGO 6 • Phosphate Mines and Plants in Florida at Noralyn, Peace Valley, Kingsford, Mulberry; in Tennessee at Mt. Pleasant and Wales

BEST ATTENDANCE EVER—AT

Control Officials Meeting

The ninth annual convention of the Association of American Fertilizer Control Officials, held in Washington October 14, drew the greatest attendance yet. Registered were 171 representatives from 44 states, Puerto Rico and Canada—including 74 control officials, 80 representatives of the fertilizer industry, 15 U. S. D. A. staff members, and 2 representatives of the trade press.

On the evening preceding the convention, National Plant Food Institute had entertained delegates and guests at a reception and banquet, which was followed immediately by a well-attended and active open-forum meeting of AAFCO's States Relations Committee.

Formal sessions began promptly the following morning, with Vice President **Dr. M. P. Etheredge** of Mississippi presiding, Secretary-Treasurer **Bruce D. Cloaninger** of South Carolina led off with his report which pointed out that 27 States have changed their fertilizer laws since AAFCO drew up its Model Fertilizer Bill.

After the roll call, President **Russell W. Ludwick** of New Mexico delivered his address on the theme "Working in Our Own Back Yards." hastening to mention that these are more than yards—they are immense fields. Citing plant food educational societies (called by many different names, but all with similar objectives) as an ideal medium for such a program, he called for more on-the-farm demonstration and research programs, cautioning that only those trials with probable positive results should be undertaken there. These organizations can best foster programs of consumer education, public relations and dealer training he continued, for their ultimate objectives are identical with those of control officials: prosperous American farmers.

Progress is made by deviation Mr. Ludwick agreed, but only if it follows certain guide posts for direction. Progress for fertilizer control work can be measured in terms of uniformity in laws; promptly available tonnage reports (which less than half the states now publish quarterly or semi-annually); improved sampling (which now averages one sample per 350 tons) with prompt analysis to prevent loss of value and significance; uniformity in handling of bulk-sales sampling; consistent treatment of fertilizer-pesticides mixtures; and adoption of elemental grade expressions of phosphorus and potassium values.

Paul T. Truitt, executive vice president of National Plant Food Institute, spoke on the program and activities of that organization. The recent consolidation of National Fertilizer Assn. and American Plant Food Council into the new NPFI will make their efforts more productive, more efficient and more helpful to the American farmer. The organization's function, he explained, is to sponsor broad objectives which its nearly 300 fertilizer manufacturers, materials producers and brokers can agree on as a unified industry.

Some of these efforts will be direct, he pointed out, while others will be handled through the industry itself. These program areas include a plan of acquainting bankers and farmers with their mutual interests in fertilizer loans; an agronomy program consisting of experimental projects and their interpretation through every available medium to the consumer; government relations toward a practical working arrangement at every level; cooperation with control officials approaching problems with state rather than federal legislation; maintenance of better statistics; and solving in-plant safety problems through cooperation with the Fertilizer Section, National Safety Council, rather than attempt a separate program.

Grace Chemical's **Dr. J. B. Pitner**, former head of the Department of Agronomy at Clemson A & M College, talked about "Plant Food Research as Related to Fertilizer Practices," treating the two jointly because they are "so completely interrelated that they cannot be absolutely separated." Sometimes, he recalled, it may seem that practice is ahead of research, but careful examination shows that this practice is based on findings of earlier research; notable in this class is the development of anhydrous ammonia application, and plow-down with possible fall application.

Plant food research has had much to do with the tremendous increase in fertilizer usage during the past ten years, Dr. Pitner reminded, citing experiments and research on various crops and soils across the nation. Soil tests are simply a method of translating laboratory data into fertilizer recommendations, he continued, but there is still much to be done at the farmer level in getting him to follow experiment station recommendations.

Urging greater support for fundamental and practical research, he cited the need for special emphasis on fall application, supplemental irrigation effects on fertilizer application levels, and fertilization of winter cover crops.

U. S. Potash Company's Technical Service Director **Dr. E. C. Kapusta**, formerly with National Fertilizer Assn., covered new developments in the manufacture of fertilizers.

These changes in methods and processes, he explained, have been brought about by the changing pattern of raw material availability. Full impact of the phenomenal growth in synthetic ammonia capacity hasn't yet been felt, he said, although domestic nitrogen production reached 2,250,000 tons in the 1954-55 year, an 80% increase over 1950-51's 1,200,000 tons. Predicting still further expansion in this phase, he pointed to new plants using natural gas, petroleum refinery gases and low-grade oil to produce a variety of nitrogen materials, including anhydrous ammonia, ammonium nitrate, nitrogen solutions, ammonium phosphates, nitrophosphates and urea-formaldehyde polymers of controlled solubility.

In the some four year period phosphatic supplies have jumped 20%, Dr. Kapusta continued, and capacity in this field is even higher than supplies indicate. The trend has been in a direction of more concentrated materials, with triple superphosphate supplies rising 50% in the interval compared with 10% increase in normal superphosphate. Mono-ammonium phosphate, mono-ammonium phosphate-sulfate (from wet process

phosphoric acid), diammonium phosphate (from electric furnace acid) and enriched superphosphate in the 25 to 33% range have led the way.

Also of much importance has been extension of continuous acidulation, he noted, along with development of carriers toward better ammoniation qualities. Still other important developments are to come in the nitrophosphates field and in hydrolysis of calcium metaphosphate.

Potash, too, has made spectacular gains, the speaker pointed out, with a 40% increase over the 1,300,000 tons produced in 1950-51 to the 1,865,000 tons of 1954-55. Further expansion is scheduled with two new firms currently developing production sites, other producers expanding existing facilities, and the explorations continuing in Canada. Notable trends have been in production of higher-analysis potash carriers and supplying of granular potassium chloride.

Mixed fertilizer plants will continue their efforts toward "chemicalization" and mechanization, Dr. Kapusta predicted, improving both chemical and physical properties of their product to keep pace with commercial development of chemical raw materials of higher analysis. Already average primary plant food content of fertilizers in 1953-54 has climbed to 26.9%, well above the 24% level of 1950. Higher-concentration mixtures are more prevalent in areas where transportation costs play a more important part in fertilizers.

Ammoniation-granulation processes will continue to become more widespread since granulation overcomes some problems with physical condition of products, he continued, and granular goods may account for up to 15% of the industry's output during the coming year. Over 100 plants have either been built for or converted to, granular processing.

Fertilizer-pesticide mixtures will also continue to grow in importance, he forecast, citing an increase from 90,000 tons in 1952-53 to 150,000 tons in 1953-54 and an estimated 200,000 tons in 1954-55. The South Atlantic and West North Central States consume about 80% of the total, and Pacific states another 7%. In all, 188 producers in 41 states account for the total output with aldrin, chlordane and DDT respectively being the more popular pesticide components and with an estimate that more than half of the tonnage was applied to corn. These mixtures, he cautioned, bring new responsibilities as well as new problems to the industry.

Finally, Dr. Kapusta predicted further growth of the liquid mixed fertilizer branch of the industry in areas where it lends itself to farming practices. Recent expansion in Indiana, Illinois, Iowa and Nebraska may well push these states ahead of California, Washington, Arizona and Texas, which have long led in sales of liquid mixed goods containing two or more nutrients.

Despite the handicap of a faulty slide projector which prevented illustrating his talk, **Dr. J. Fielding Reed,** Southern manager for American Potash Institute, reviewed Ratios and Multiple Grades as Related to Soil Testing. Tracing changes in the way recommendations have been made following soil tests, he told how many laboratories used to suggest a certain application of a particular grade followed by a side-dressing with a specific material or its equivalent.

Then it became a fairly common practice to recommend simply of poundage of plant nutrient per acre, leaving choice of materials or grades up to the farmer. Farmers and experiment stations are rather well established on grades, though, so this system did not completely fill the need, he continued, and has been modified widely to a recommendation in terms of pounds of plant nutrient plus a suggested grade and application rate.

Even this system has its faults, Dr. Reed explained, for there is often need for recommendation of other elements than primary, which complicates the reporting of sampling, although not enough laboratories are equipped for minor element analysis.

Probably the most satisfactory compromise for the present, he concluded, is the pounds of plant nutrient recommendation with a suggested grade and rate, accompanied by a conversion table for use if a different grade is selected.

R. B. Ellsworth, consulting chemist and general manager of R. B. Ellsworth & Associates, summarized current trends of "Complete Liquid Fertilizers." As a liquid plant owner and operator he also engineers and and installs similar operations. Citing midwest expansion since the spring of 1953, when complete liquid goods were first introduced in Indiana at a price competitive with solid mixtures of comparable nutrient content, he blamed the big rush on the fact that manufacturers accepted liquids before farmers did. Calling liquids "just another tool for farmers" he believes they are here to stay as evidenced by a number of plants which are already operating profitably.

The basis for profitable operations, Mr. Ellsworth stated, is this: 1) At least $100,000 capitalization, since the plant costs about $35,000 and the remainder is needed as working cash; 2) Low-cost formulations are imperative, and there are about 16 of these; 3) Good engineering based on the plant's own individual needs, with emphasis on accurate measuring devices, holding scale and meter error tolerance to ¼ of 1%; 4) An adequate sales and distribution system. The latter may be either custom application through dealers or retail delivery to farm storage tanks on a "do it yourself" basis. Distribution generally can be effective within a 30 to 50 mile radius.

A 2000 ton plant reaches the break-even point, while a 5000 ton plant has a very favorable set-up; should sales exceed 10,000 annual tons, a second plant in an adjacent territory is advisable. As yet it has not been determined that a large plant (of comparable tonnage to larger solid fertilizer plants) would be profitable, and the current trend toward decentralization may prevent a larger plant from being tried.

The liquid mix business is characterized by an extremely high sales cost, which may have a bearing on liquid production not reaching 1% of total fertilizer production in the nation yet. Most popular liquid grades, Mr. Ellsworth pointed out are: 12-6-6, 10-10-10, (9-9-9 in winter), 3-11-11, 6-18-6, 8-24-0 and 12-8-4.

On the credit side of the liquids ledger, he enumerated: savings in time and labor; high-nitrogen formulations providing crop needs in one application; ease of adding pesticides and trace elements; and quickly-available nutrients.

Few liquid plans have laboratories, and so must depend heavily on state laboratories except for simple chemical tests for pH and specific gravity. In testing sample formulations for salting-out temperatures, he cautioned, they must be removed from the f r e e z e r and shaken thoroughly, or they will fail to salt-out despite passing the critical temperature. No truly effective additive has yet been developed which will lower the salting-out point.

Further work must be done on developing sampling standards for analysis, he concluded, with samples being taken from manufacturers storage tanks and trucks, but not from farm storage tanks where too many uncontrollable factors can affect the analysis.

After a lunchtime recess, the pro-

CF STAFF PICTURES 1—Retiring President Russell W. Ludwick of New Mexico receives honorary plaque from Immediate Past President Henry Davis of New Hampshire.

2—AAFCO 1955-56 officers: Vice President J. D. Patterson of Salem, Oregon, President M. P. Etheredge, State College, Miss., Secretary-Treasurer Bruce D. Cloaninger, Clemson, S. C.

3—New Executive Committee of AAFCO: Back row: Bruce D. Cloaninger (South Carolina), J. D. Patterson (Oregon), C. V. Marshall (Canada), F. W. Quackenbush, (Ind.),: Front row: M. P. Etheredge, (Miss.), R. W. Ludwick, (New Mexico), Stacy B. Randle (New Jersey), J. J. Taylor (Florida).

4—Virginia's State Chemist Rodney Berry, Richmond, and Paul T. Truitt, Exec. Vice Pres. of National Plant Food Inst., Washington.

5—Executive Vice Pres. Russell Coleman, and Chief of Agronomic Relations, W. H. Garman, both of National Plant Food Inst., Washington.

6—K. D. Jacob, head of USDA's Fertilizer & Agric. Lime Section, Beltsville, and Robert B. Ellsworth, consulting chemical engineer for liquid fertilizer plants, Indianapolis.

7—Lea S. Hitchner, Sec. of National Agric. Chem. Assn., chats with H. A. Houston, aged 97½ and the only surviving founder of the association of Official Agric. Chemists, at banquet for control officials sponsored by National Plant Food Inst. on the evening preceding meeting.

8—Stacy B. Randle of New Brunswick, N. J., and F. W. Quackenbush, Lafayette, Ind.

9—Incoming AAFCO President, M. P. Etheredge, Mississippi receives gavel from retiring President R. W. Ludwick, New Mexico.

10—Malcolm H. McVickar, Chief Agronomic Education, Nat'l. Plant Food Inst., Washington, and A. H. Bowers, Swift & Co., Agronomist, Chicago.

11—John O. Hardesty, Senior Chemist, USDA, Beltsville, and M. D. Sanders, Swift & Co., Chicago.

12—E. W. Constable of North Carolina and E. A. Epps, Jr., of Louisiana.

13—J. B. Pitner, manager of Agricultural Services for Grace Chemical Co. in Memphis, and former head of South Carolina's Dept. of Agronomy at Clemson A & M College, with Raoul Allstetter, Vice President, Nat'l. Plant Food Inst., Washington.

14—Olin Mathieson's D. T. Cook of Pasadena, Texas, and Arthur M. Smith of Baltimore.

15—J. Fielding Reed, Sou. Mgr., American Potash Inst., Atlanta, R. P. Thomas, Int. Minerals Chicago, G. H. Marsh, Director, Div. Agric. Chemistry, Montgomery.



gram continued with **W. C. Winton,** chief inspector for Feed, Seed and Fertilizer Division of Oklahoma's Department of Agriculture, speaking on "Acquainting the Public with Our Program." The inspector, he feels, is himself one of the key public relations tools for the control office, and therefore requires careful selection and training. Close work with other agricultural agencies can be most helpful, too, with emphasis on close experiment station contacts, he suggested, and control officials appearing before classes in agricultural colleges to explain their functions to the students.

In addition, control officials could appear on television and radio farm reporter shows, he said, but cautioned that the interviews should be kept interesting as well as educational—and not too technical. Inspection report publications should be made as concise and easily-understood as possible. Mr. Winton illustrated with slide projections showing Oklahoma's simplified quarterly and annual reports, showing how electronic machine tabulation had streamlined their procedure.

In closing he reminded officials that the plant food educational society can be most valuable in getting the public acquainted with control work—and in getting plant food consumption boosted toward extension service goals.

USDA's **Walter Scholl,** of the Fertilizer and Agricultural Lime Section, presented an interesting study which he, Hilda M. Wallace and Esther I. Fox have just completed on "Distribution of Bulk Fertilizer in 1953-54." Confined to the delivery of solid bulk mixtures and materials for direct application, the study consists of tables, graphs and charts which show tonnages in all states except Vermont (which reported bulk lime deliveries only) and New Mexico (reporting only anhydrous ammonia bulk sales), and the territories, where manufacturers reported no bulk deliveries are being made.

With the figures for 1953-54, Mr. Scholl presented some bulk tonnages that were prepared for the 1952 AAFCO meeting by Maurice Rowe of Virginia, covering 1950 and 1951 estimates compiled from control officials. He hastened to point out, however, that data was not complete enough to arrive at a trend, but noted that his 1953-54 total of 6.2% average tonnage shipped in bulk was less than 1% above the average of 1950-1951 estimates.

In general, he concluded, the figures indicate that most bulk deliveries in New England, Middle Atlantic and South Atlantic were mixtures; in East and West North Central and East and West South Central states most of bulk tonnage was primary nutrient materials, while Mountain and Pacific states reported most of their bulk deliveries was secondary and trace element materials.

President Ludwick called next for Investigators' reports, then Committee reports:

Dr. F. W. Quackenbush of Indiana, reporting on "Potassium," recommended the change to elemental expression of potassium content in grades, scheduled tentatively for 1955 in KR-2 regulation, he postponed to 1958, which a vote approved.

J. B. Smith of Rhode Island reporting on "Calcium, Magnesium and Manganese," proposed that C-11 "calcined" be substituted for "calcinated" and "slake" for "slack."

Rodney C. Berry of Virginia on "Boron" reported borate usage continuing to climb as low-solubility materials become more prevalent, and predicted even more general use in the near future.

On "Mixing and Segregation" Virginia's **M. B. Rowe** reported sampling difficulties on dry-mixing operations using granular, semi-granular and pulverized materials in combination. Citing a plant where 700 samples showed 59% violations (although officials knew proper materials were going into mixture), he told how work with the manufacturer had brought material purchases to a more uniform size and reduced violation samples to 8.3% of all samples.

Dr. H. J. Fisher of Connecticut reported on the successful meeting of the States Relations Committee the previous evening. A panel, with Dr. Fisher presiding, included also: **J. L. Clough** of Delaware; **Bruce Poundstone** of Kentucky; **Henry Walls**, committee secretary, of Maryland; **Bruce D. Cloaninger** of South Carolina, ex-officio committeeman; **Dr. E. C. Kapusta** of U. S. Potash Co., New York; **Dr. Sam Thornton** of F. S. Royster Guano Co., Norfolk; **W. J. Tucker** of Coop. GLF Soil Building Service, Ithaca, N. Y.; and **M. D. Sanders** of Swift & Co., Chicago. This panel discussed the following topics individually, inviting further discussion and answering additional questions from the floor:

1. If the nitrogen in a liquid fertilizer is derived solely from urea, should a guaranty of "Total Organic Nitrogen" be: (a) permitted; or (b) required?

2. Should all States adhere to the letter of Regulation T-R-1 and consequently forbid the use of a fourth numeral in the grade to cover magnesium?

3. What is the most acceptable group name for the urea-formaldehyde polymers that have recently appeared on the market as sources of available not-readily-soluble nitrogen?

4. Should over-run in one component be balanced against underrun in another component in deciding whether a sample is deficient?

5. Should not tolerances be on a percentage rather than an absolute basis, so as not to penalize high-analysis fertilizers where problems of controlling analyses, sampling, segregation, etc., are actually greater?

6. Has the use of different analytical methods by industry and control chemists been an actual problem, particularly as regards analyses for insecticide ingredients?

7. How should the application of diluted fertilizer solutions to lawns by oil companies be handled, from the points of view of labeling, registration, reporting of tonnages used and payment of taxes thereon?

8. Should the present guaranties for P_2O_5 and K_2O be changed to an elemental basis, and if so, when and in what manner should the change be brought about?

Dr. Stacy B. Randle of New Jersey reported for the Model State Fertilizer Bill on recommendations made to and by the Executive Committee. It was proposed that the bill include a clause recommending a blanket registration fee on small package goods, similar to the one imposed in Virginia; that penalties for delinquent tonnage reports be included. Referred to a special subcommittee for further study were: reexamination penalty assessments in view of new scientific statistics; and a recommendation to express phosphorus and potassium guarantees in elemental form in grades, following with expression of P_2O_5 and K_2O analysis until the new basis became established. This was amended to carry the elemental values in parenthesis, following standard grade statement.

Publications report, prepared and sent by G. H. Ridder of Washington, recommended a uniform listing of materials in published state tonnage summaries.

Dr. Allen B. Lemmon of California reporting on "Other Agricultural Chemicals" said that fertilizer-pesticides mixtures are now sold in 38 of the 48 states, and that he had no additional recommendations to make at present.

Dr. J. F. Fudge of Texas reported for the Special Committee of Fertilizer Guarantees. He said replies to his summer questionnaire are still coming in, but with 40 states and Canada reporting, only two could change to elemental P and K guarantees without legislative action. Most of the remainder would be able to approve both expression (P and P_2O_5, K and K_2O) for a limited or indefinite period of time; six could not approve it without new legislation which would be one to five years in passage. He reported 91% of the Texas extension workers disapproved the change in nutrient statement.

Following the report of the Executive, Auditing, Resolutions and Nominating committees, the new slate of officers was elected and the meeting adjourned. Next year's meeting was announced for October 19 at the Shoreham Hotel in Washington.

NEW OFFICERS

President: M. P. Etheredge, State College, Miss.; Vice President: J. D. Patterson, Salem, Oregon; Secretary-Treasurer (Re-elected): Bruce D. Cloaninger, Clemson, S. C.

Held over as Executive Committeemen: J. J. Taylor, Chairman, Tallahassee, Fla.; Stacy B. Randle, New Brunswick, N. J.

Re-elected to Executive Committee: F. W. Quackenbush, Lafayette, Ind.

Elected to Executive Committee: C. V. Marshall, Ottawa, Ont., Canada.

Does supplemental irrigation really pay off? Olin Mathieson got the answer directly from the experts at a recent national sales meeting of its irrigation representatives at Little Rock, Arkansas. Three farmers who have used irrigation successfully reported their results. Left to right, Dr. G. G. Williams, manager of irrigation research for Olin Mathieson, Thomas W. Crockett, director of the irrigation department, and farmers Bezy, Allen and Pruett.



RESEARCH REPORT

By Earl R. Swanson*

MINIMIZING THE COST OF FERTILIZER MIXES

A method that has been developed for maximizing or minimizing a linear function subject to a set of linear restrictions may have application to certain industrial operations involving the physical mixing of materials in such a manner that the total cost of the materials entering the mixture is minimized. The method is known as linear programming or activity analysis (3). We illustrate the application of the technique to the problem of mixing a fertilizer to meet a certain set of requirements. It is hoped that the illustration may suggest application to other industrial problems of a similar nature[1].

We must first construct the linear cost function that is to be minimized. In this case we have available fourteen different fertilizer materials (Table 1) with their associated prices (Table 2). Letting the quantities of materials be designated as x^i ($i=1, 2, 3, \ldots, 14$) and their associated unit prices as p^i, we may write the cost, C, as follows:

$$C = \sum_{i=1}^{14} x_i p_i \qquad (1)$$

The problem is to choose the x^i that will minimize the cost and yet furnish the desired product.

We may next introduce the restrictions or requirements that define the desired characteristics of the mix. First, the total quantity of mixed fertilizer that is to be produced is specified. In this case we will produce one ton; hence we have

$$\sum_{i=1}^{14} x_i = 2{,}000 \text{ pounds} \qquad (2)$$

The formula of the mixed fertilizer to be produced must, of course, be considered as a requirement. In this example we assume production of a 4-12-4 mixed fertilizer; thus we must have (at least) 80 pounds of N, 240 pounds of P_2O_5, and 80 pounds of K_2O in the mixture. Letting a^i equal the percentage of N, b^i equal the percentage of P_2O_5, and d^i equal the percentage of K_2O in each of the

Table 1.—Composition of Fertilizer Material[1]

Fertilizer material i	N a^i	Available P_2O_5 b^i (percent)	Water-soluble K_2O d^i	Equivalent acidity (A) or basicity (B) in pounds of $CaCO_3$ k^i (per 100 pounds material)
1. Ammonium nitrate	32.5	—	—	60A
2. Ammonium sulfate	20.5	—	—	110A
3. Calcium cyanimid	22.0	—	—	63B
4. Calcium limestone	—	—	—	90B
5. Castor pomace	6.0	1.5	0.5	6A
6. Cottonseed meal	6.6	2.5	1.5	10A
7. Dried blood	13.0	—	—	23A
8. Fish scrap (dried)	9.5	6.0	—	7A
9. Manure salts	—	—	25.0	—
10. Muriate of potash	—	—	60.0	—
11. Sand	—	—	—	—
12. Sulfate of potash magnesia	—	—	26.0	—
13. Superphosphate	—	20.0	—	—
14. Tankage	7.0	—	—	13B

[1]Sauchelli, Vincent, Manual on Fertilizer Manufacture. The Davidson Chemical Corporation, Baltimore, 1946. Table 2, p. 19, and Table 39, p. 88.

Table 2.—Price Situations Used to Compute Materials Needed to Minimize Cost of a Ton of Neutral 4-12-4

Fertilizer material	Price situations I	II	III	IV	V	VI	VII
	(dollars per ton delivered to mixing plant)						
Ammonium nitrate	70.00	80.00	60.00	80.00	70.00	50.00	60.00
Ammonium sulfate	60.00	70.00	50.00	70.00	80.00	40.00	60.00
Calcium cyanimid	70.00	60.00	80.00	150.00	150.00	120.00	130.00
Calcium limestone	3.50	4.00	3.00	5.00	3.50	2.00	4.00
Castor pomace	32.00	30.00	34.00	30.00	40.00	40.00	35.00
Cottonseed meal	80.00	60.00	100.00	60.00	60.00	35.00	40.00
Dried blood	140.00	120.00	160.00	120.00	90.00	70.00	75.00
Fish scrap (dried)	110.00	80.00	140.00	80.00	70.00	60.00	55.00
Manure salts	20.00	15.00	25.00	15.00	20.00	20.00	15.00
Muriate of potash	40.00	45.00	35.00	45.00	40.00	50.00	35.00
Sand	3.50	2.00	5.00	2.00	3.00	3.50	3.00
Sulfate of potash magnesia	32.00	25.00	39.00	15.00	20.00	20.00	30.00
Superphosphate	30.00	35.00	25.00	30.00	50.00	40.00	30.00
Tankage	120.00	100.00	140.00	45.00	45.00	80.00	50.00

Table 3.—Quantities of Materials Needed to Minimize Cost of a Ton of Neutral 4-12-4

Fertilizer material	Price situations (see Table 2) I	II	III	IV	V	VI	VII
	(pounds)						
Ammonium nitrate	107.7	107.7	107.7	107.7	107.7	107.7	107.7
Ammonium sulfate	156.1	38.1	156.1	156.1	156.1	156.1	156.1
Calcium cyanimid	59.1	169.0	59.1	22.0	22.0	16.9	16.9
Calcium limestone	221.2	—	221.2	256.2	256.2	266.4	266.4
Castor Pomace	—	—	—	136.0	136.0	—	—
Cottonseed meal	—	—	—	—	—	140.7	140.7
Dried blood	—	—	—	—	—	—	—
Fish scrap (dried)	—	—	—	—	—	—	—
Manure salts	—	320.00	—	—	—	—	—
Muriate of potash	133.3	—	133.3	132.2	132.2	129.8	129.8
Sand	122.6	165.2	122.6	—	—	—	—
Sulfate of potash magnesia	—	—	—	—	—	—	—
Superphosphate	1,200.0	1,200.0	1,200.0	1,189.8	1,189.8	1,182.4	1,182.4
Tankage	—	—	—	—	—	—	—
Total	2,000.00	2,000.0	2,000.0	2,000.0	2,000.0	2,000.0	2,000.0
Material cost per ton	$31.79	$34.28	$27.47	$34.92	$47.22	$36.45	$32.37

Since linear programming follows a definite procedure rather than the less formal "cut-and-try" method, it is well adapted to use of calculating machines. The quantities of ingredients as well as the total cost of the mixed fertilizer for each price situation presented here required about three minutes of computing time with an electronic computer. Approximately five minutes were spent in preparing each problem for the machine.

Literature Cited

(1) Charnes, A. et al. An Introduction to Linear Programming, New York.–John Wiley and Sons, 1953.

(2) Charnes, A. et al. "Blending Aviation Gasolines–A Study in Programming Interdependent Activities in an Integrated Oil Company."–Econometrica 20:135-159 April, 1952.

(3) Koopmans, T. C., ed. Activity Analysis of Production and Allocation, Cowles Commission for Research in Economics, Monograph 13, New York. John Wiley and Sons, 1951.

Assistant Professor, Department of Agricultural Economics, College of Agriculture, University of Illinois, Urbana, Illinois.

[1]For another type of industrial application, see (2).

fourteen ingredients, we may write the formula requirements as follows:

$$\sum_{i=1}^{14} a_i x_i \geq 80 \text{ pounds} \quad (3)$$

$$\sum_{i=1}^{14} b_i x_i \geq 240 \text{ pounds} \quad (4)$$

and

$$\sum_{i=1}^{14} d_i x_i \geq 80 \text{ pounds} \quad (5)$$

In addition let us say that a neutral mixture is desired. Letting the equivalent acidity or basicity in pounds of $CaCO_3$ (Table 1) be designated as k^i we may write this restriction as follows:

$$\sum_{i=1}^{14} k_i x_i = 0 \quad (6)$$

where opposite signs are attached to the acidity and basicity equivalents.

Consideration of the above requirements alone may lead to a minimum cost mix that has certain undesirable properties with respect to drillability. Hence, it may be desirable to specify the maximum and minimum quantities of certain nitrogen carriers. In this case we specify that at least 13 pounds of N must come from organic sources:

$$a_3x_3 + a_5x_5 + a_6x_6 + a_7x_7 + a_8x_8 + a_{14}x_{14} \geq 13 \text{ pounds} \quad (6)$$

where the subscripts refer to the ingredient numbers in Table 1. In addition we restrict the quantity of N that may be obtained from ammonium nitrate to 35 pounds. Hence we have

$$a_1x_1 \leq 35 \text{ pounds} \quad (7)$$

The problem may now be stated succinctly as the minimization of (1) subject to the restrictions (2) through (7). Computation of the solutions were performed by using the simplex method (1). The results for seven different price situations are presented in Table 3.

Several interesting observations may be made concerning the least-cost combinations in Table 3. For example, in moving from situation I to II, we see that the nitrogen from calcium cyanimid is cheaper (14 cents a pound) than that from ammonium sulfate (17 cents a pound). However, calcium cyanimid does not completely replace ammonium sulfate due to the requirement of a neutral mixture. Situation III results in the same quantities of materials as situation I, even though there has been some change in the prices compared with situation I.

In price situation IV we see that, although manure salts are a cheaper source of potash than muriate of potash, they are not used. These two sources of potash have the same price relation in situation IV as in situation II, but the manure salts were selected in situation II. When all requirements are considered, the cost per pound of any particular element may be misleading. Note also that the least-cost combinations in situations IV and V are the same even though in situation V the nitrogen in tankage is slightly cheaper (32 cents a pound) than the nitrogen in castor pomace (33 cents a pound).

Finally, situations VI and VII result in the same combination of materials. Here the cost per pound of nitrogen from dried blood in situation VII is 29 cents a pound compared with 30 cents a pound in cottonseed meal. However, cottonseed meal is used because its contribution to requirements other than nitrogen makes the over-all cost of the mixture a minimum. Thus we see that **all** of the requirements must be considered in calculating a minimum-cost mixture.

NW Plant Food Meets Nov. 23

Reports on farm demonstration projects sponsored in Washington and Idaho and a proposed demonstration project in Oregon will be a part of the program of the annual convention of the Pacific Northwest Plant Food Association at Bend, Oregon, November 2nd and 3rd. The Farm Projects in which farms are selected, fertilizer furnished free and technical advice by the Soil Improvement Committee of the Association, are one of the main projects of the Association.

Russell Coleman, vice president of the National Plant Food Institute will be one of the main speakers at the convention. Other speakers will include Dr. William Pearl, administrator of the Bonneville Power Administration, who will be a noon luncheon speaker on November 2nd, talking on "Electric Power and Agriculture;" and J. D. Patterson, Chief Chemist, State Department of Agriculture for Oregon.

A new slant on what the fertilizer industry should point to will be given by Burton Hutton, assistant 4-H Club leader for Oregon, in a talk on educating the younger generation on the value and usage of farm crops.

Election of officers and the annual banquet will be held on November 2nd. Arrangements are being made for entertainment of the women.

MIDWEST SOIL MEET TO ATTRACT HUNDREDS

Plans will be presented for expanded educational activities to help promote greater fertilizer use, at the Middle West Soil Improvement Committee's annual meeting Thursday, October 27, at the Sherman Hotel in Chicago.

More than 200 representatives of MWSIC's active and associate member companies are expected to attend, plus a number of specially invited guests.

W. M. Newman, of the Price Chemical Company, Louisville, Ky., MWSIC acting president, will open the business meeting at 9:30 a. m. Mr. Newman became head of the organization last June, when Harold S. Vorhes resigned to establish his own fertilizer company at Charles City, Iowa.

Members will review reports by R. G. Fitzgerald, of the Smith-Douglass Co., Inc., Streator, Ill., MWSIC treasurer and H. E. Wood, of The Farmers Fertilizer Co., Columbus, Ohio, chairman of the audit committee.

Z. H. Beers, executive secretary will summarize results of the committee's 1954-55 educational program in various media, including: 1—newspaper publicity in 1,750 dailies and weeklies regularly receiving illustrated and unillustrated stories; radio scrips released to 275 Corn Belt stations, plus live and transcribed programs 2—articles in farm magazines reaching national regional and state readership; 3—distribution of MWSIC color folders and film strips to vocational agriculture teachers in 2,000 schools in 13 states.

Mr. Beers will also describe results of the committee's grant-in-aid program sponsoring fertilizer research at Midwestern colleges and experiment stations. He will likewise report on field trips and contacts with colleges and stations.

CFA CONVENTION

SUNDAY, MONDAY AND TUESDAY, NOVEMBER 6, 7 and 8

SUNDAY, NOVEMBER 6

2:00 to 5:00 P.M. Registration, Lobby, Hotel Mark Hopkins

5:00 P.M. Cocktails and Buffet Dinner, in the Red and Owl Rooms, Bohemian Club, San Francisco. Courtesy Mr. and Mrs. Wilson Meyer and Wilson & Geo. Meyer & Co.

7:15 P. M. Take buses at Bohemian Club to Cow Palace for final performance of the Grand National Livestock Exposition. (Tickets to be issued at Bohemian Club) Courtesy of Mr. and Mrs. Wilson Meyer and Wilson & Geo. Meyer & Co. Buses will return to Hotel Mark Hopkins following performance.

Business Session

Room of the Dons, Lobby Floor, Hotel Mark Hopkins

MONDAY, NOVEMBER 7

8:00 A.M. Registration, Lobby, Hotel Mark Hopkins

9:00 A.M. Business Session Call to Order—President B. H. Jones, California Fertilizer Association

9:15 A.M. "National Plant Food Institute Activities" Dr. Russell Coleman, Executive Vice President, National Plant Food Institute, Washington, D. C.

10:15 A.M. ANNUAL BUSINESS MEETING OF MEMBERSHIP (**All** Delegates should attend)

1. Election of Directors
   a. Report of Nominating Committee, Chairman Jack Baker
2. Report of Constitution and By-Laws Committee, Chairman W. L. Dixon, Jr.
   a. Proposed Agricultural Ammonia Membership Category
   b. Other Proposed Amendments
3. Proposed CFA Administrative Budget for Calendar Year 1956, Wm. E. Snyder, Chairman, Budget Committee
4. Proposed Soil Improvement Committee Budget for Calendar Year 1956, Wm. E. Snyder and M. E. McCollam

11:30 A.M. Organization Meeting of new Board of Directors, Room of the Dons

12:30 P.M. Luncheon, Peacock Court (All Delegates and Ladies)

1:30 P.M. Award Presented to Man-of-the-Year

1:45 P.M. "Using Advanced Practices as a Means of Maintaining a Sound Agriculture." J. Earl Coke, Vice President, Bank of America, San Francisco (Former Assistant Secretary of Agriculture and Former Director of Agricultural Extension for California)

2:30 P.M. Panel Discussion, all Delegates participating Subject—Importance of Soil Fertility and Plant Nutrition in the Sound Marketing of Fertilizer Materials Moderator—Dr. Daniel G. Aldrich, Jr., Chairman, Department of Soils and Plant Nutrition, University of California, Davis

Panel Members—Dr. J. E. Knott, Chairman, Dept. of Vegetable Crops, University of California, Davis; F. Haven Leavitt, Senior Agricultural Technologist, Shell Chemical Corp., San Francisco; Dr. Guy F. MacLeod, Technical Vice President, Sunland Industries, Inc., Fresno; Millard E. McCollam, Western States Manager, American Potash & Chemical Institute, Inc., San Jose

6:00 to 7:00 P.M. Cocktail Party, Top-of-the- Mark, Courtesy American Potash & Chemical Corporation

7:30 P.M. Charcoal Broiled Steak Dinner, Peacock Court, Courtesy Shell Chemical Corporation.

TUESDAY, NOVEMBER 8

Entire Day Will be Devoted to Recreation

8:00 A.M. Men's Golf Tournament—Lake Merced Golf and Country Club—Green Fee $5.00

10:00 A.M. Men's Bowling Tournament, Bagdad Bowling Alleys—1641 Ellis St., San Francisco

12:00 Noon Ladies' Cocktail Party and Luncheon, Top-of-the-Mark, Courtesy California Fertilizer Association

6:00 to 7:00 P.M. Cocktail Party, Room of the Dons, Courtesy Balfour, Guthrie & Co., Limited

7:30 P.M. Annual Banquet, Peacock Court

9:00 P.M. Awards—Bridge, Golf, Bowling and Door Prizes—Lisle and Edna Garner

9:30 P.M. Entertainment — Lisle Garner, Committee Chairman

10:00 P.M. Dancing—Music by Jack Fisher and His 10-Piece Orchestra

Ladies' Program

SUNDAY, NOVEMBER 6, 1955

2:00 to 5:00 P.M. Registration, Hotel Lobby

5:00 P.M. Cocktails and Buffet Dinner, Bohemian Club —Courtesy Mr. and Mrs. Wilson Meyer and Wilson & Geo. Meyer & Co.

7:15 P.M. Buses leave Bohemian Club for final performance, Grand National Exposition—Courtesy Mr. and Mrs. Wilson Meyer and Wilson & Geo. Meyer & Co.

MONDAY, NOVEMBER 7, 1955

8:00 A.M. Registration, Hotel Lobby

9:00 A.M. Ladies' Golf Tournament — Lakeside Golf Course of the Olympic Club—Green Fee $5.00—Facilities made available by Country Club Committee, Olympic Club

12:30 P.M. Luncheon, Peacock Court, for all delegates and those ladies not golfing

1:00 P.M. Ladies' Putting Contest — Lakeside Golf Course of the Olympic Club

2:00 to 5:00 P.M. Bridge or Canasta — Phoenix and Conquistador Rooms, Hotel Mark Hopkins

6:00 to 7:00 P.M. Cocktail Party—Top-of-the-Mark—Courtesy American Potash & Chemical Corporation

7:30 P.M. Charcoal Broiled Steak Dinner — Peacock Court — Courtesy Shell Chemical Corporation

TUESDAY, NOVEMBER 8, 1955

12:00 Noon Ladies' Cocktail Party and Luncheon — Top-of-the-Mark—Courtesy CFA

2:00 to 5:00 P.M. Bridge or Canasta—Phoenix and Conquistador Rooms

6:00 to 7:00 P.M. Cocktail Party—Room of the Dons—Courtesy Balfour, Guthrie & Co., Limited

7:30 P.M. Annual Banquet—Peacock Court

9:00 P.M. Awards—Bridge, Golf, Bowling and Door Prizes

9:30 P.M. Entertainment

10:00 P.M. Dancing—Music by Jack Fisher and His 10-Piece Orchestra

(Continued on page 52)

DEVELOPMENT OF *Potash* USE IN MIDWEST

By WERNER L. NELSON, Midwest Manager,
American Potash Institute, Inc.

One of the outstanding developments in crop production practice in the United States in the past 10 years has been the greatly increased use of nitrogen, phosphorus, potassium and lime in the Midwest. There has been a growing realization of the need for correcting the deficiencies and for replacement of the plant nutrients removed in crop production. Some of the midwestern soils are recognized as the most fertile in the nation but many others have been found to be deficient in one or more elements.

The early and continuing work of the research and extension workers laid the foundation for wise use of plant nutrients and the information has been placed in the hands of the farmer and the fertilizer industry. The intensification of the efforts of the colleges now taking place should encourage still greater developments in use of lime and fertilizers.

N, P_2O_5 and K_2O usage*

There is a wide range in climate, soils, and types of agriculture among the states in the Midwest. Hence there is considerable range in plant nutrient requirements.

East North Central States. Considering the states of Ohio, Indiana, Illinois, Michigan, and Wisconsin, the consumption of nitrogen, phosphorus and potassium has increased rapidly (Figure 1). The usage of K_2O now exceeds that of available P_2O_5.

The total nutrient content of mixed fertilizers has increased steadily since 1935, from a total of 21.10 percent in 1935 to 32.19 percent in 1954 (Figure 2). While a part of this is related to the increase in N and P_2O_5 the greatest share of the gain is due to the increased K_2O content, i.e., from 6.52 percent to 14.32 percent. In this group of states Wisconsin has the highest total nutrient content of mixed fertilizers (35.37 percent) and the highest content of K_2O (17.21 per cent).

There of course has been a continued procession of fertilizer grade changes. The 2-12-2 was replaced by 2-12-6 and then the 2-12-6 by 3-12-12. Now 3-12-12 is being replaced by such fertilizers as 4-16-16 and 5-20-20.

West North Central States. The states in this group are Missouri, Iowa, Minnesota, Kansas, Nebraska, South Dakota and North Dakota. Usage of plant nutrients is increasing rapidly with N and P_2O_5 consumption rising somewhat faster than K_2O (Figure 3). Potassium tends to be present in greater quantities in soils in lower rainfall regions and nitrogen and phosphorus are more limiting than potassium. However, in many areas the high yields resulting from nitrogen and phosphorus applications are increasing the need for supplementary additions of potassium.

The total nutrient content of mixed fertilizer has risen rapidly in the past 20 years. Nitrogen, phosphorus and potassium have increased about the same amount (Figure 4). In this group of states Minnesota has the highest total nutrient content in mixed fertilizers (39.60 percent) and the highest content of K_2O (14.60 per cent).

Midwest as a whole: It is interesting to observe the percentage of the United States consumption of potash that is used in the Midwest (Figure 5). In 1935 only 13 percent was used in the Midwest while in 1954 the proportion had risen to 46 percent.

The consumption data for K_2O by states over the past 20-year period in Table 1 reveal where the greatest increases have occurred. The increases in Indiana, Illinois, and Ohio have been particularly striking. These states now rank, respectively, first, second, and fourth, in the nation in use of potassium. Missouri, Iowa, and Minnesota were formerly considered to be border states in respect to use but the consumption more than doubled in the four-year period from 1950 to 1954.

Removal of Potassium by Crops

The Midwest has around 250 million acres of cropland and produces over 75 percent of the corn, 90 percent of the soybeans, 50 percent of the wheat, and 80 percent of the oats in the nation. This means that there is a tremendous drain upon the supply of potassium as well as other nutrients.

It is enlightening to calculate crop removals and examples of such calculations for Illinois and Minnesota are shown in Table 2. These are based on present yields and do not include pasture. Illinois is a state with relatively high usage of potash, but even then removals are con-

* Consumption data based on U.S.D.A. reports.

Figure 1. In the East North Central States (Ohio, Indiana, Illinois, Michigan and Wisconsin) the consumption of K_2O now exceeds that of available P_2O_5.

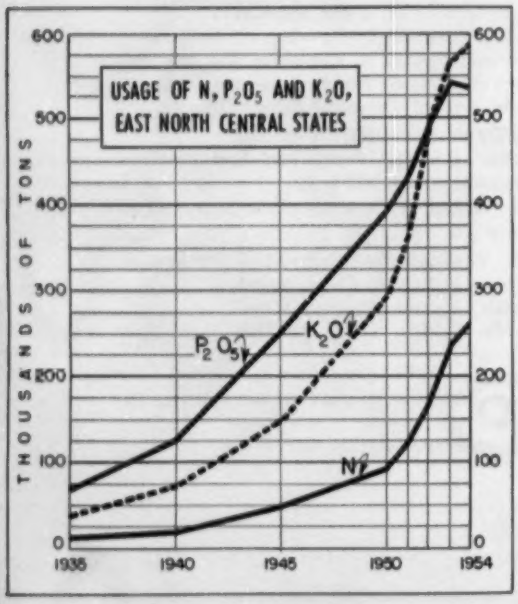
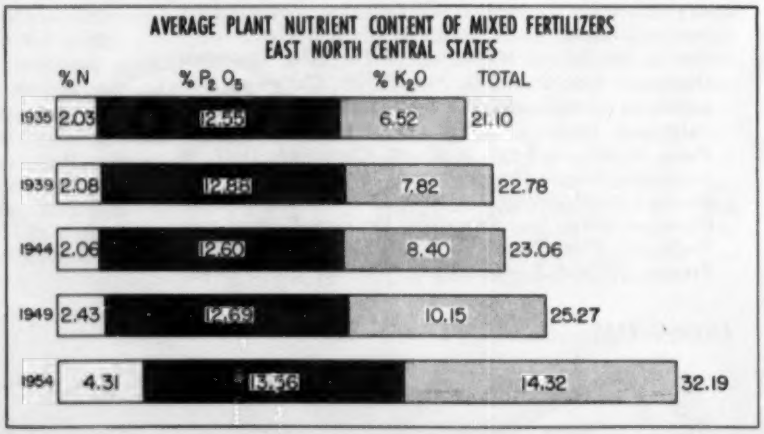


Figure 2. The total nutrient content of mixed fertilizers in the East North Central states is increasing, with the greatest share of the gain being due to potash.



siderably greater than additions of potassium in fertilizer. While Minnesota is a state in which potassium use is also increasing rather rapidly, the estimate gives an indication as to the speed with which the soils are being depleted.

A more specific example might be cited in a corn-soybean-wheat-hay rotation in which the approximate removal by good yields is as follows:

Yield	Removal of K_2O Lbs. per acre	
Corn (grain)	100 bu.	25
Soybeans (grain)	35 bu.	50
Wheat (grain)	40 bu.	13
Hay	3 tons	100
		188 lbs. of K_2O removed from each acre every four yrs., or 47 lbs. annually

Assuming that the corn and hay are fed to livestock and 50 per cent of the potash returned, the removal would still be 125 lbs. per acre per rotation or 31 pounds annually.

Calculations on removal are open to question in many ways as the soil will release some potassium and some will be leached or lost by erosion. Likewise in a livestock system part of the potassium is returned but usually only about 50 percent. These calculations do illustrate the point, however, that the storehouse of potassium is being depleted. Some soils are already at the critical level, some have a moderate supply, and others still have a large amount of potassium in reserve.

It is important that these various soil conditions be identified in order that potassium will be applied where it is needed. Much work in the laboratory, greenhouse, and field has been done by the colleges to work out the relationships between soil conditions and the response of crops to potassium.

Diagnostic Techniques

Deficiency symptoms: Symptoms of potassium deficiency on corn and legumes were observed in the Midwest many years ago. Such symptoms have been and still are being used to advantage to point out areas of need. Much publicity has been given to symptoms and agronomists at the state level and many of the workers at the county level are fairly well familiar with the symptoms. Very few of the farmers can recognize potassium deficiency symptoms, however (Figures 6 and 7).

As we strive for higher yields we cannot rely on symptoms to give us the answer. This is true not only of potassium but also of many other nutrients. In the first place, a plant may be suffering from a shortage but not show external symptoms. This is sometimes called "hidden deficiency". In the second place, by the time a plant shows reasonably severe potassium deficiency the yield has been cut badly. Lastly, the symptoms of potassium deficiency are often masked by disease or insect damage or by other nutrient deficiencies. Hence, there has been much emphasis on the need for chemical tests on soils and plants.

Soil tests: Extensive research on chemical methods for evaluating the available potassium in soils has been underway in the Midwest for many years. This has been accompanied by calibration of the tests with crop response in field experiments. These studies furnished a good starting basis for soil testing and soil testing has expanded rapidly since 1945. In 1951 the Soil Test Work Group reported a greater intensity of sampling of the agricultural acreage in the Midwest than in any other area of the United States. One soil sample was reported to have been taken for each 280 acres. Since that time the number of soil samples tested has increased considerably.

There is little question but that soil tests have been of tremendous value in pointing out needs for potassium. A specific recommendation on a farmer's field always means more to him than a general recommendation.

Table 1. Consumption of K_2O by States in Midwest (1935-1954)

	1935 tons	1940 tons	1945 tons	1950 tons	1951 tons	1952 tons	1953 tons	1954 tons
Ohio	12,311	22,744	46,190	80,383	98,768	114,098	130,924	130,873
Indiana	11,213	24,990	46,265	81,408	106,060	125,906	148,921	162,423
Illinois	1,281	4,323	18,038	49,584	77,243	118,134	144,465	151,955
Michigan	6,545	12,642	24,411	42,198	53,123	64,708	76,297	76,464
Wisconsin	2,111	5,699	21,981	44,967	58,661	56,808	64,062	71,803
Kentucky	2,048	3,347	11,638	30,497	34,784	49,332	51,881	57,961
Missouri	1,142	2,029	6,761	23,170	38,105	48,760	59,146	64,226
Iowa	460	882	7,517	15,059	20,019	24,111	35,503	45,525
Minnesota	1,216	1,494	6,082	18,981	21,670	24,099	29,774	37,556
Kansas	80	205	466	1,324	2,372	2,946	3,856	3,979
Nebraska	4	17	4	193	324	458	1,072	1,698
So. Dakota	3	3	22	35	82	150	142	217
No. Dakota	1	19	379	1,205	1,038	1,560	1,437	1,275
Midwest	38,415	78,394	189,754	389,004	512,249	631,070	747,480	803,955

Table 2. Estimated removal of K_2O by major grain crops and hay in Illinois and Minnesota (based on present yields)

	Illinois		Minnesota	
	Acreages	K_2O removed Tons	Acreages	K_2O removed Tons
Corn	9,077,000 (50 bu)	68,077	5,354,000 (48 bu)	40,155
Soybeans	4,289,000 (22 bu)	75,058	2,022,000 (21 bu)	35,385
Oats	3,328,000 (42 bu)	13,312	5,088,000 (32 bu)	20,352
Wheat	1,549,000 (29 bu)	6,196	705,000 (16 bu)	2,820
Hay	2,737,000 (1.7 T)	82,110	3,515,000 (1.9 T)	105,450
Barley			1,073,000 (26 bu)	4,292
Flax			1,000,000 (9 bu)	2,500
Total K_2O removed		244,753		210,954
K_2O applied in fertilizer 1953-54		151,955		37,556

Figure 4. The total nutrient content of mixed fertilizers in the West North Central States is increasing with the gain being shared about equal among N, P_2O_5 and K_2O.

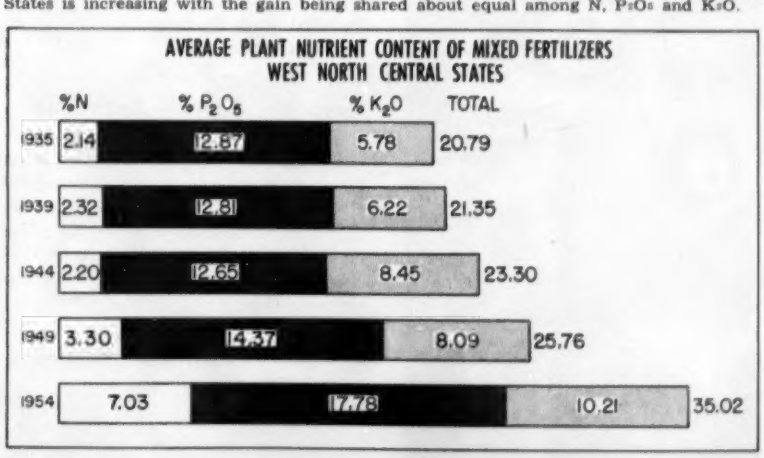


Figure 3. In the West North Central States (Missouri, Iowa, Minnesota, Kansas, Nebraska, South Dakota and North Dakota) the usage of plant nutrients is increasing rapidly with N and P_2O_5 rising somewhat faster than K_2O.

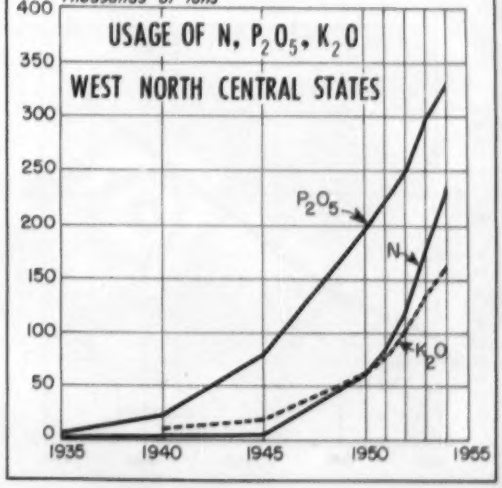




Figure 6. This map of Minnesota based on a summary of soil tests helps to draw attention to potassium needs. The percentage of soils testing low and medium are shown. (Minn. Agr. Ext. Bul. 277)

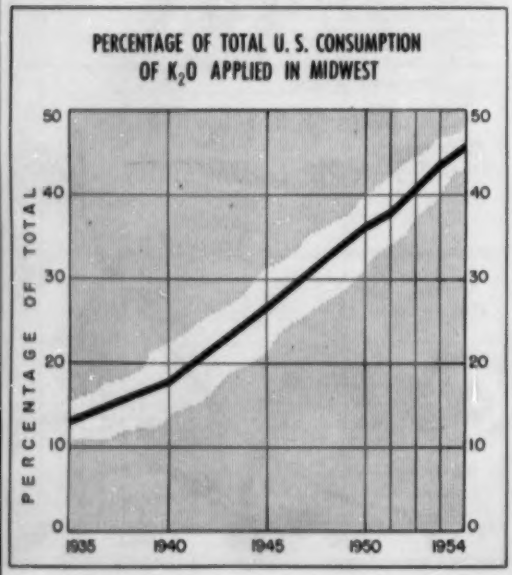
Summaries of soil tests have been of much importance in emphasizing areas where potassium is likely to be deficient. In such areas potassium may receive more emphasis in the educational program than might otherwise have been the case. Such summaries have been made in a number of states and an example of a map prepared in Minnesota is shown in Figure 8.

Tissue tests: Tests on the growing plant have been helpful in pointing out the potassium status. Several types of tissue testing kits have been assembled, among them the Purdue soil and plant testing kit for pH, P, and K in soils and NO_3, P, and K in plants. Over 6000 of these kits have been sold since it was first developed in 1934.

A more recent development has been the dipicrylamine filter paper test for potassium in plant tissues. In this test the plant sap is squeezed on each of the three dipicrylamine dots and after washing with dilute acid the general level of potassium in the sap is evaluated (Figure 7).

The filter paper test is gradually increasing in popularity. For example, in Missouri and Minnesota the county agents are equipped for K tests as well as P and NO_3. Proper use of these tests takes careful coaching, however, in order to avoid misinterpretations.

Figure 5. A steadily increasing percentage of the United States consumption of K_2O is being applied in the Midwest.



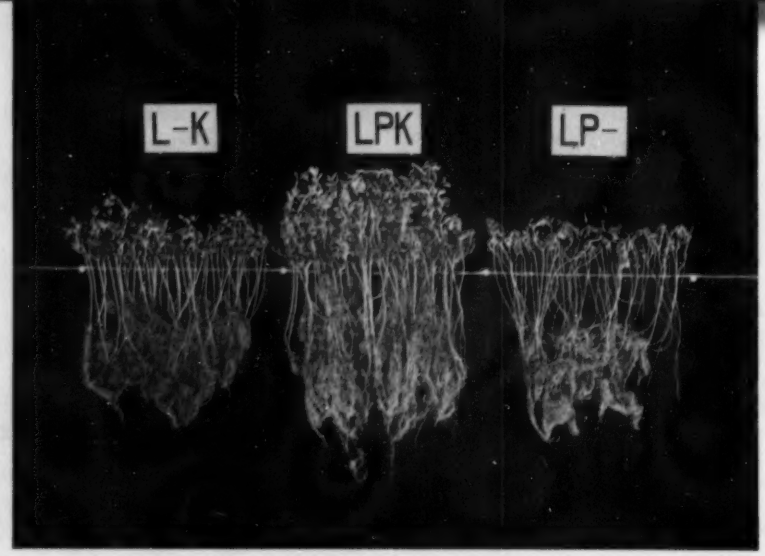


Figure 6. Roots as well as tops show symptoms of deficiency. Note the reduced root growth of this young alfalfa when P is omitted (left) or K is omitted (right) on this soil low in available P and K. (From research plots of P. E. Johnson, University of Illinois, at West Salem Soil Expt. Field. Photo by H. L. Garrard).

Summary

The remarkable advance in use of potassium in the Midwest has taken place because of the needs existing and the pointing up of this need through research and subsequently through extension. It is generally agreed that much larger amounts are needed, however. Advances in this direction will be assisted by the continued use of diagnostic tools to show where potassium as well as other nutrients can be effectively used. The industry has been helpful in encouraging such an approach and in supplying what is needed.

Figure 7. Tests on the plant tissue are helpful in evaluating the level of potassium in the plant. A plant may be suffering from a lack of potassium but not show external symptoms. The leaf from the normal plant tests high in potassium while the leaf from the potash-starved plant does not even give a test in the low potassium spot on the filter paper. (Photo by H. L. Garrard).



Oklahoma Plant Food Group to Meet

The Board of Directors of the Oklahoma Plant Food Association met September 29, and amended the By-Laws, as directed at the annual meeting held September 1, in Stillwater, Oklahoma. The association's name has been changed to "Oklahoma Plant Food Educational Society, Inc."

R. J. Kenyon, President, has announced that a "Fertilizer Conference", sponsored by the Oklahoma Plant Food Educational Society, Inc., has been scheduled for November 29 and 30 at the Student Union Building, Oklahoma A & M College, Stillwater, Okla. Emphasis will be made on getting fertilizer dealers, and everyone interested in learning more about better use of fertilizer, out to this meeting. A Program Committee has been appointed and they are planning an excellent program.

Soybean Council Approved

The formation of an overall soybean industry council to meet industrywide problems was approved by the American Soybean Association in its 35th annual convention. The Association empowered its board of directors to proceed with such an organization.



'WAY OUT AHEAD!

WEATHERLY GRANULATION

20 TO 60 TONS PER HOUR

•

CONTROLLED GRANULATION

•

GUARANTEED HIGH RATE OF PRODUCTION

•

LOWEST RAW MATERIAL COST

•

HIGHEST QUALITY, HEAVY DUTY EQUIPMENT

•

CONTINUING SERVICE

● Major fertilizer companies have looked the field over with care—and have chosen the Weatherly Controlled Granulation Process. Our installations, a dozen initiated since June of last year, have proven the soundness of the Weatherly "package" — and borne out all we have said, in person, in writing, and in print:

- They produce a closely sized product — all through 6 mesh and retained on 16 mesh screen.
- They stay on the designed capacity.
- They turn out a high quality, high volume, guaranteed production, using the lowest cost raw materials.
- They are built with the highest quality, heavy duty equipment.

The D. M. WEATHERLY COMPANY

Industrial Engineers and Builders

830 Ponce de Leon Ave., N.E., Atlanta, Georgia PHONE: ELgin 8384

RESEARCH RESULTS AND REPORTS

Plane dusting will be more efficient when USDA's researchers perfect what they call a "fluidizer". This works on dust much as a carburetor does on gasoline—pushing air through the material so it comes out in a liquid-like mass. Now they are working on where to put it on a plane, and how to widen the switch. The Insect Pest and Plant Disease Control Equipment Research Laboratory, Toledo, Ohio is the USDA unit working on it if you'd like to ask for details.

• • •

Amino hunt at Texas A & M. Two scientists there are digging into which amino acids are produced by what plants, by way of radioactive sulphur in the plant food. They are Dr. J. L. Liverman and Dr. J. B. Ragland.

• • •

Dry soil seems to be helped by fertilizer. U of Nebraska's M. D. Weldon says fertilizer on dry ground helped grow 26 bushels of fall wheat, as against 13 bushels came up without fertilizer.

• • •

6-day crops grow in a machine called the Herbagere. It is built in stages, each of which will produce 40 to 45 pounds of green forage each six day, so you can have a continuous crop. Niamco, Inc., Dallas, Texas, makes them.

• • •

Irrigation frequency—intervals of 7 to 11 days—and not cutting until plants reached 12 inches—seem to boost yields of grass-legume forage, USDA tests over a 3-year period in the Pacific Northwest seem to show. 50 pounds of N per acre seemed to maintain the right ratio of clover to grass.

• • •

15-B rust resistant spring wheat has been produced at U of Minnesota, tested in the field, and soon to go into milling and baking tests. They use X-ray and atomic bombardment, which seems also to work on several oat varieties, where stem rust is a problem. Now they are going after the Helminthosporium blight, prevention of which might bring back the Victoria varieties of oats formerly widely used.

Lime nourishes according to research results by Dr. W. A. Albrecht, and is more important for that than because it neutralizes acidity. At U of Missouri he grow crops in four-year rotation with manure the only treament. Tests showed pH 4.6 which is supposed to be acidity that would bar forage crop growth. Dr. Albrecht's conclusion: that the neutralizing effect of the carbonate is overemphasized, and the nourishing effects of calcium and magnesium forgotten.

• • •

Gin trash humus is a big thing to Dr. C. L. Curlee, a farmer near Corpus Christi, Texas. Now that gins are built to take cotton insects out of trash, he advocates putting the trash back on the land as humus. And he practices what he preaches, using 3,000 pounds per acre, which he will do for three years until his land has a total of 9,000 pounds of gin trash per acre. Add this to the stubble which is left as mulch and Dr. Curlee figures he has made available to his soil 10,000 pounds of organic matter per acre, and tests conducted in that area have shown gin trash containing more fertilizer value than barnyard manure. The ginners like the idea because it saves trash-burning . . . and will increase yields in their area through soil improvement.

360 plots on a five acre tract are under cultivation at the North Florida Experiment Station, where R. W. Wallace is juggling fertilizers and seasons and crops in an effort to find out the winning parlay. He varies the levels of N, P, K and lime. He clips and weighs the result of 30 different methods of fertilization. He will continue, he says, from 3 to 6 years.

• • •

Need sulphur on Mississippi crops, say USDA—Mississippi Experiment Station researchers. Without sulphur soil samples grew normal crops twice, fell off on subsequent crops until the seventh was a failure. They say you can use sulphur free fertilizer, but if you do you'd better add sulphur as an ingredient or as a separate treatment.

Feed phosphorus to cattle, says a 30 page bulletin of the Oklahoma A & M AES, result of a four-year study. A mineral phosphorus supplement is beneficial for the production of beef cattle, both winter and summer in southeastern Oklahoma. In north central Oklahoma it is a margin of safety in dry years. Range beef seem to need 7 gm daily per head in winter, and more in spring and summer.

• • •

Acidity is a common cause of legume failure in the East, says Dr. David F. Beard, USDA forage specialist, despite the simple ways to determine soil condition, and the ease of correcting it with lime.

• • •

Leaching helps reclaim excessive salt or alkali land, as has been demonstrated on the Huntley Irrigation Project near Billings, Montana.

• • •

A lime slide rule has been devised that can give the liming requirements for any plant, flower, tree, shrub, vegetable or farm crop grown in any type of soil. The plant group slide is positioned opposite the soil acidity reading and the amount of lime required for the best growing condition is read directly from the scale. Alum requirements for alkaline soils are also given. The rule has separate scales for small areas and for farm operations. A free brochure on the Soil Reaction Slide Rule is available from the LaMotte Chemical Products Company, Towson 4, Maryland.

• • •

Synthetic topsoil is putting up flourishing trees and grass in Brooklyn's Marine Park. The city had to cover some fill. It had plenty of sludge which was being carried out to sea and dumped there, expensively. They put it down in layers four inches thick mixed with seven inches of sand—a topsoil that settles down to about nine inches in depth.

Colling's "Commercial Fertilizers" Reprinted

The fifth revision of Colling's standard text on "Commercial Fertilizers" which came off the press in January 1955 has sold so well that a reprint has already become necessary. The book was published by the McGraw-Hill Book Company of New York. It was written by Dr. Gilbert H. Collings, Head, Department of Agronomy at Clemson College. It sells for $8.00 a copy.



TENNESSEE CORPORATION

TRIPLE SUPER-PHOSPHATE

1. RUN-OF-PILE FOR MAXIMUM AMMONIATION
2. GRANULAR FOR DIRECT APPLICATION
3. PROMPT SERVICE TO MEET EVERY REQUIREMENT

Superior phosphate fertilizers have been produced for nearly 30 years. This unequalled experience is your assurance of quality and dependability in Triple Superphosphate. To plan your shipments for maximum satisfaction, call upon your Bradley & Baker representative today.

U.S. PHOSPHORIC PRODUCTS

Division TENNESSEE CORPORATION Tampa, Florida

Sales agents: **BRADLEY & BAKER**

155 EAST 44th STREET • NEW YORK 17, N. Y.

District Sales Offices: ATLANTA • INDIANAPOLIS
ST. LOUIS • NORFOLK • HOUSTON

Safety

A list of first aid needs is required by law in North Carolina . . . and suggested by humanity and production economy as well. This is an excellent check on your first aid methods.

FIRST AID EQUIPMENT THAT CUTS LOST TIME INJURIES

By Frank Crane, Commissioner of Labor
N. C. Department of Labor

FIRST AID

A study of the reports of lost-time injuries in the fertilizer plants of North Carolina for the past three years shows that a large percentage of these injuries were caused by infection. Lost-time injuries resulting from infection can be prevented. A further study of the lost-time injuries caused by infection shows that most such injuries result from the failure of employees to report accidents which at the time do not appear to be serious.

The reporting of all injuries, no matter how small, is not only important to a good first aid program, but is absolutely necessary to any overall accident prevention program. Failure to report small injuries not only may result in infection and loss of time, but it seriously handicaps accident prevention and the necessary correction of accident causes.

Because the reporting of any accident is so important, the necessary steps should be taken to determine the reasons why employees do not report small injuries.

Failure to provide adequate first aid supplies, or failure to have trained personnel to administer first aid, are two of the main reasons why employees fail to report small injuries. Investigations have shown that time and time again employees failed to report small injuries because they knew that adequate first aid facilities were not available. Investigations also have shown that when first aid supplies were not convenient, employees failed to report minor injuries.

If failure to provide adequate first aid supplies and trained personnel to administer first aid are the main causes of failure to report accidents, which have caused so much lost time due to infection, the obvious solution would be to adequately provide these facilities. A special check of your first aid set-up will tell you whether it meets the needs of your individual plant. The first aid needs of a fertilizer plant naturally vary according to the size of the plant. There are, however, certain fundamentals which should be considered in checking any first aid program. These requirements, taken from the book **Industrial Safety**, by R. P. Blake, are as follows:

1. Fully competent first aid attendants.
2. Adequate quarters and equipment.
3. Proper organization and record.
4. Employee cooperation.

Whether you have a first aid kit for five employees or a plant hospital, cleanliness and efficiency are important. Too often a check of first aid cabinets shows not only the cabinet but the supplies to be in an unsanitary condition. Another failure of the one-cabinet system is for the supplies to be exhausted when they are needed. Supplies necessarily must be available when needed; therefore, if it is necessary to lock the first aid cabinet, a key should be in the hands of some person who stays at the cabinet and not in the hands of the superintendent who usually is away from the cabinet.

Other dangers of "worst aid" are self-administration in case of small accidents, and the use of "home-made" remedies that have been used for years. There is no place in a good first aid program for the removing of objects from the eye by employees who use anything from match stems to ends of dirty handkerchiefs. Old fashioned ideas like using tobacco juice and snuff for an antiseptic thrive best in plants which do not have well kept first aid supplies. The failure to use first aid supplies or the misuse of these supplies results in infection, which in turn causes lost time, misery, and financial loss.

First aid supplies, as required by statute, are listed under Rule I of the **Rules** and **Regulations Governing Work Places** and **Working Conditions** of the North Carolina Department of Labor. This list, a copy of which is attached, only includes the minimum requirements. For large plants that have first aid rooms, other supplies and equipment are needed. These needs can best be ascertained by studying the type of first aid cases most prevalent. Also a vital part of any first aid program, especially in plants large enough to have first aid rooms, is a system of recording and following up minor injuries. Good records in this connection not only will aid in preventing infection, but will greatly assist in eliminating the fundamental causes of accidents.

During World War II many first aid courses were taught in connection with civil defense programs. Civil Defense authorities continued these opportunities during the Korean War and in many communities are giving these courses at the present time. The Red Cross also offers many opportunities to receive first aid training. If your plant does not have a trained person, or persons ready to administer first aid during all plant working hours, immediate arrangements should be made to secure such training from your nearest Civil Defense Office, a Chapter of the American Red Cross, or from the North Carolina Industrial Commission.

A good first aid program not only is the surest way to prevent infection but it is an excellent means of securing employee cooperation and participation. First aid is a vital part of any accident prevention program. As the Green Cross is the symbol for the best in accident prevention, the Red Cross is the symbol for the best treatment of all injuries that occur in spite of accident prevention.

Rule 1.

First Aid—The first-aid supplies required by Section 6556 Consolidated Statutes, shall consist of the following articles, kept in a tight cabinet, marked "First Aid" supplies:

1. The contents of the first-aid case shall be as follows:

Instruments

1 pair scissors
Thumb forceps
Tourniquet
Graduated medicine glass

Drugs

2 oz. aromatic spirits of ammonia
2 oz. 4 per cent boric acid
2 oz. alcholic iodine solution, half strength (for external use)
2 3-oz. collapsible tubes of bicarbonate of soda mixed with vaseline (3 per cent for burns)
2 oz. castor oil (for eye injuries)

[redacted] shows you why

International's New Triple Superphosphate assures more

complete ammoniation

ONE look shows you why International's new Triple Superphosphate offers such a big advantage in ammoniation. Its improved fineness of texture; uniform, dust-free particles; and correct chemical structure assure maximum ammoniation in minimum time — help cut your manufacturing costs. International's new Triple Super is made by an improved process from high quality rock. Result: a high analysis product (46% A.P.A. or better). Special conditioning before shipment helps prevent setting up en route. This, plus improved particle size, means less grinding before mixing, more economical handling, better texture in your finished products and high product performance. International's new Triple Super is ready for immediate delivery to your plant. Write or wire the Phosphate Chemicals Division for samples and quotations.



INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago 6

Dressings

1 doz. assorted sizes steril gauze bandages.

1 spool Z.O adhesive plaster, 1 inch by 5 yds.

3 one-half ounce packages of absorbent cotton

Splints of assorted sizes for fractures

Wooden applicators wound with cotton

Wooden tongue depressors

2. All bottles or other containers containing drugs or other substances shall be clearly labeled and the specific purpose for which the contents are to be used shall be marked thereon.
3. If the establishment occupies more than one floor, a stretcher shall be provided.
4. In every establishment where a first-aid kit is to be maintained, at least one person shall be instructed by a physician, or an accredited first aid expert of the American Red Cross, on how to apply first aid to injured persons and shall have charge of first-aid kit and its maintenance. (Such a person may recommend supplies equivalent to the above in lieu of those listed)
5. In establishments having two or more rooms and/or occupying two or more buildings or floors, the number of approved first-aid kits to be maintained and the number of persons to be instructed in the use thereof shall be determined by the Commissioner of Labor.

Safety Record For Eston Chemicals

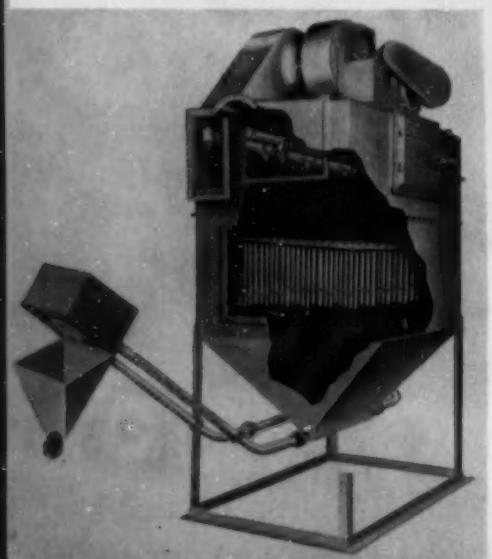
The Eston Chemicals Division of American Potash & Chemical Corporation recently completed two years without a lost-time accident. The division, located in Los Angeles and employing an average of approximately 100 persons, reached a total of nearly 40,000 man-hours for the period.

Attaining the two-year safety mark was attributed by Russell Sunderlin, plant manager, to three main causes: an intensive modernization plan, the company's safety-education program, and the safety-promoting activities of the plant union.

Considerable modernization has been underway at the Eston Chemicals Division during the past two years. As an example, the agricultural chemicals dust plant has been installed with complete safety equipment including ventilating and dust-collecting units to protect workers.

The company's safety program was revised approximately two years ago to include an employee education program which was inaugurated on the premise that "human failure" caused most accidents, rather than mechanical failure. Weekly safety education meetings have been held with Eston employees to discuss general safety subjects and specific danger problems.

Regarding union efforts to reduce accidents, the union's safety committee has met regularly with the Eston safety committee to inspect the plant for industrial hazards.



A special dust control unit has been developed that removes microscopic solids, fumes and odors from exhaust gases at 99% efficiency. It can be used anywhere impurities are encountered of extremely low and even sub-micron size particles.

Efficiency up to 99% has been obtained in test situations with dust loadings at five grains per cubic feet and 70% of the material below five-microm particle size.

The new unit, known as the Type A Hydro Precipitator Scrubber, is a development of The Johnson-March Corporation, Philadelphia. It collects dust by hydro-compressing exhaust gases through a system of multiple tubes into a water chamber. This produces a highly efficient scrubbing action. The violent water agitation set up causes secondary pressure turbulance and additional scrubbing action in the tube chamber.

The scrubber comes in 15 sizes for capacities ranging between 500 cfm and 40,000 cfm. Sludge can be removed constantly or intermittently by manual, hydraulic or mechanical means.



J. W. Carothers, (left) president of Baltimore Safety Council, presents Award of Honor of National Safety Council to M. G. Geiger (right) president of Davison Chemical Company, Division of W. R. Grace & Co. A. B. Pettit, Davison's director of Industrial Health & Safety, is in center.

Davison Wins Highest Award Of National Safety Council

For the fourth time in five years Davison Chemical Company Division of W. R. Grace & Co., has won the "Award of Honor" of the National Safety Council, the highest award which the council grants, it was announced yesterday at a meeting of the National Safety Council.

Marlin G. Geiger, president of Davison, joined with A. B. Pettit, the company's director of Industrial Health & Safety, in accepting the award from J. W. Carothers, president of the Baltimore Safety Council.

To win the honor, Davison on a company-wide basis in 1954 scored a 58% reduction in frequency of accidents and a 32% reduction in severity of accidents from "par" figures set up by the national organization, which are averages derived from previous accident records.

In addition to the national award, the Safety Council's Award of Merit went to Davison plants at Curtis Bay, Md.; Bartow, Fla.; Perry, Iowa, and Nashville, Tenn., and its Commendation Certificate to Gretna, La., and Columbus, O., plants.

South Point Logs Million Safe Man-Hours

The Nitrogen Division South Point plant passed the million-man-hour mark in June without a lost-time injury. Three times previously, the plant has passed the mark. The longest stretch occurred in 1950 when 2,061,784 were logged without a lost-time injury.

Contributing to the record were the following sections which have not had a single lost-time injury since the plant began operation in September 1945: cafeteria, Construction, Electrical, Gas Production, Industrial Relations, and Stores. The Chemical Section and main office have over a million man-hours without a lost-time injury.

Hopewell holds the Division record for injury-free man-hours—2,324,791.

NEW FERTILIZER PACKAGE!

Seems like "only yesterday" that St. Regis announced this new development and already the demand has exceeded our expectations



THE EXPERIENCE . . .
RESEARCH AND SERVICE

behind The Man from St. Regis
consistently bring
to multiwall bag users
a constant flow
of new developments
designed to provide
you with better bags
at lower packaging costs.



MULTIWALL PACKAGING DIVISION

ST. REGIS PAPER COMPANY

Sales Subsidiary—St. Regis Sales Corporation, 230 Park Avenue, New York 17, N. Y.

CF Staff–Compiled TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by COMMERCIAL FERTILIZER Staff

State	August		July		Apr.-May-June Quarter		January thru June		July thru December		Year (July-June)	
	1955	1954	1955	1954	1955	1954	1955	1954	1954	1953	1954-55	1953-54
Alabama	17,375	16,746	14,887	14,771	410,529	426,577	844,071	924,968	267,041	147,702	1,114,238	1,074,892
Arkansas	7,414	5,303	9,292	5,930	136,306	147,461	270,894	313,787	59,887	52,438	330,776	366,225
Georgia	16,226	13,103	51,173	38,504	718,919	761,348	1,047,875	1,147,157	225,083	218,027	1,273,445	1,361,254
Louisiana	12,007	6,390	6,888	6,940	108,810	110,234	232,781	250,747	78,067	74,471	310,848	325,218
Missouri	.....	54,299[1]	11,433	9,467	205,628	226,893	394,979	500,020	268,257	256,427	682,690	756,457
N. Carolina	15,575	20,377	12,417	9,205	740,666	694,799	1,566,158	1,558,472	264,475	257,100	1,830,633	1,815,572
Oklahoma	9,629	8,238	3,423	2,879	28,029	31,627	63,799	72,809	58,406	71,558	122,305	144,367
S. Carolina	23,221	11,033	11,355	8,667	269,475	160,908	791,206	752,639	132,604	183,919	928,715	936,558
Tennessee	.....	9,921[1]	25,862	23,256	218,999	322,123	282,462	405,756	167,383	107,544	523,349	523,303
Texas	12,588	12,817	20,311	15,484	156,592	168,687	371,587	374,309	212,885	186,097	584,269	560,381
Calif.	(reports submitted quarterly)				320,702	299,195	603,857	513,300	318,270	317,270	922,127	830,327
Virginia	(reports submitted quarterly)				349,218	314,945	636,585	620,261	159,185	160,715	795,770	780,931
Indiana	(reports submitted semi-annually)						873,966	896,104	284,994	283,987	1,158,960	1,180,091
Kentucky	(reports submitted semi-annually)						433,102	489,024	91,386	88,905	524,488	577,929
New Jersey	(reports submitted semi-annually)						.....	231,686[1]	53,830	57,923	.....	289,614[1]
Washington	(reports submitted semi-annually)						124,186	101,779	58,162[1]	*	182,348[1]	*
TOTAL	114,035	94,007	167,041	135,103	3,663,873	3,665,897	8,537,508	8,921,132	2,641,753	2,464,088	11,102,613	11,233,505

.....(not yet reported) * Not compiled [1] Omitted from column total to allow comparison with same period of current year.

EVERYTHING YOU NEED
TO MANUFACTURE AND SELL
LIQUID MIXED FERTILIZER



BE A MANUFACTURER—
MAKE MORE PROFIT!

Using Our Equipment and Knowledge, You Can Produce Liquid Mixed Fertilizer for $28.13 per ton (5-10-10) to $41.05 per ton (10-10-10). (prices based on Illinois freight rates)

WE FURNISH: ALL THE EQUIPMENT — COST DATA — THOROUGH TRAINING — CHEMICAL FORMULAS — MERCHANDISING AIDS — SOURCES OF SUPPLY!

We furnish everything you need to manufacture and sell liquid mixed-fertilizer—all you need is the building site. Our experience and research at the Midstate pilot plant in Clinton, Illinois, helps you build a sound business in liquid mixed-fertilizer manufacturing and selling. You or anyone you designate will be trained and taught every phase of manufacturing and selling at our plant. We have a complete package deal including all the equipment, complete training, cost data, chemical formulas, etc. "Package plants" are available in capacities from 15 to 30 tons per hour. If you are interested in making more profits with a minimum of investment we strongly urge you to write us so we can rush all the information to you. A 15 ton per hour plant will service your local trade area, the cost is $9,737.00 f.o.b. Decatur. Nitrogen storage additional.

WRITE TODAY AND BE THE ONE IN YOUR AREA TO MAKE THE PROFITS FROM FERTILIZER

MIDSTATE MACHINERY CO.

359 EAST MAIN DECATUR, ILL. *TELEPHONE 8-4363*

MARKETS

ORGANICS: Producers of Nitrogenous Tankage have not made any change in their prices varying from $4.10 to $5.10 per unit of Ammonia, bulk, f.o.b. production points.

CASTOR POMACE: Possibly a few cars at $40.000 per ton f.o.b. New Jersey.

DRIED BLOOD: Around $5.50 per unit of Ammonia f.o.b. Chicago.

GROUND COTTON BUR ASH: A number of buyers, some of them who have not previously bought, have come in the market for this material at 50¢ per unit of K_2O, f.o.b. production point.

PHOSPHATE ROCK: Most of the producers have settled with labor on an increased wage but the price situation on account of this increase in wages, has not been definitely developed.

AMMONIUM NITRATE: Movement is rather slow which is usual at this time of the season.

GENERAL: The movement in Florida seems to be quite active and also a good deal of movement in California but, otherwise, movement is not very large in other states.

Blaw-Knox Publishes Cable Life Treatise

In an 8-page folder, Form 2510, Blaw-Knox Company have published excerpts from a paper presented by their Arnold Hooper at the Materials Handling Conference, which will help users of overhead traveling bucket cranes to get maximum cable life and top performance from their clamshells. It will be sent free if you write them at Box 1198, Pittsburgh 30, Pa.

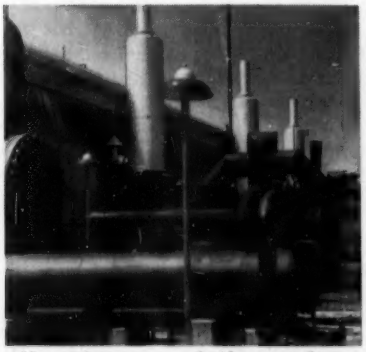


"Push-button machinery" is a feature of this new plant of the Cotton States Fertilizer Company, Macon, Ga. One of the largest plants in the area (over 50,000-ton capacity) Cotton States supplies Georgia dealers with Blue Banner Fertilizer.

Cotton States Fertilizer Co.

. . . Another Spensol User

C. B. Clay (above) is president of the Cotton States Fertilizer Co. The company was organized in 1912.



Here is some of the modern equipment used by Spencer to produce SPENSOL Nitrogen Solutions for some of America's leading fertilizer mixers.



On time deliveries of SPENSOL solutions have helped to build Spencer's reputation for dependable service to mixers throughout the country.



New kind of solution injector, giving better ammoniation of mixed fertilizer, was invented by H. B. Davis of Spencer Chemical Company staff.



SPENCER

SPENCER CHEMICAL COMPANY, Dwight Bldg., Kansas City 5, Mo. District Sales Offices: Atlanta, Ga.; Chicago, Ill.; Memphis, Tenn.; Works: Pittsburg, Kans.; Henderson, Ky.; Chicago, Ill.; Vicksburg, Miss.; Orange, Texas.

America's Growing Name in Chemicals

CROP CHEMICALS

Karabatsos Joins NAC Staff

Kimon T. Karabatsos, former administrative assistant to Rep. A. L. Miller (R. Neb.), has been appointed to the staff of the National Agricultural Chemicals Association, L. S. Hitchner, NAC Executive Secretary, has announced. Karabatsos' duties will be concerned with legislative and special services.

Canadian Industries and Chipman Chemicals Join

Pesticides operations of Canadian Industries, Ltd., and Chipman Chemicals, Ltd., Canadian manufacturer pesticides, will be merged into a joint company to be owned 50% by C.I.L. and 50% by Chipman Chemicals. The new firm will be known as Chipman, Ltd.

Head office of the new concern will be in Montreal with four plants at Buckingham, Que., Hamilton, Ont., Winnipeg, Man., and Moosejaw, Sask.

C.I.L.'s Agricultural Chemicals division will continue its other operations. Until sales offices of Chipman, Ltd. are established in Eastern Canada, its products will continue to be handled through C.I.L. offices. In Western Canada, products of the new company will be handled from existing offices of Chipman Chemicals.

Shell Chemical Ups Endrin Supply

Endrin supplies were substantially increased when additional manufacturing facilities were recently completed, F. W. Hatch, manager of the agricultural chemicals division of Shell Chemical Corporation, announced.

Endrin, a stereoisomer of dieldrin, has been used extensively for the control of cotton and tobacco insects since its introduction two years ago. Endrin, a versatile insecticide, has also shown outstanding results in controlling insects affecting sugar beets and cabbage seedlings.

Manufacturing facilities are located at Shell Chemical's Denver plant.

California Spray-Chemical To Build French Plant

California Spray-Chemical Corp., subsidiary of Standard Oil Co. of California, has received approval from the French government to build a $1,500,000 plant to manufacture captan, a fungicide, in France, according to Norbert D. Van Buren, Calspray's manager of Eastern Hemisphere operations and president of California-Spray-Chemical Cie Francaise.

Production of the French plant is expected to be "on stream" by fall of 1956, and will be sufficient to supply the French and other European markets.

Monsanto Has New Herbicide

Monsanto Chemical Co. has developed an important new weed killer which it plans to market to corn belt farmers in 1956.

It is a pre-emergence herbicide developed specifically to control annual grass pests in corn, soybeans and other crops. Applied at the same time the crops are planted, it remains in the soil's surface layer to kill grasses as they germinate for a period of six to eight weeks after application.

The new weed killer would be the first Monsanto-developed farm pesticide to be marketed under the company's label, one of 19 or more farm chemicals to be sold next year in a 15-State Midwestern area for the first time in packages bearing the big, red block M of Monsanto.

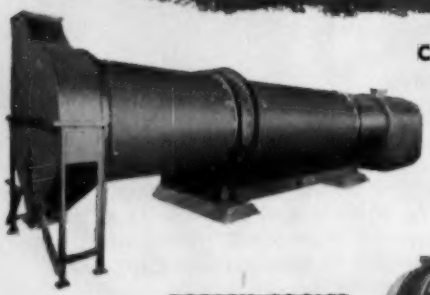
Union Bag Extends Promotion

The success of Union Bag & Paper Corporation's publicity program in behalf of the fertilizer industry has prompted the company to continue this novel campaign during 1956.

According to Sydney K. Bradley, Union's Vice-President in charge of multiwall bag sales, the enthusiasm of individual fertilizer manufacturers contributed greatly to the success of this program.

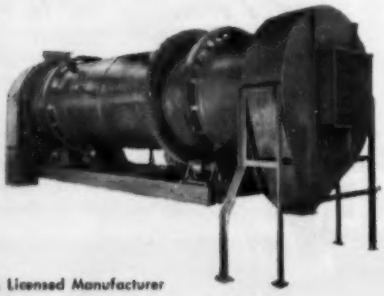
"To date we have released five stories in this series," Mr. Bradley said. "Each of them went to the editors of 2500 weekly farm newspapers. All of them stressed the part good fertilizer practices play in successful farm management."

DRYERS AMMONIATORS* GRANULATORS* ELEVATORS COOLERS CONVEYORS for the Fertilizer Industry



CONVENTIONAL DRYER

Heavy-Duty rotary unit with furnace, burner, breeching and air handling system. Used for ammoniated granular fertilizers and other chemicals. Also DehydrO-Mat Variable Inclination Dryers (Pat. pend.).



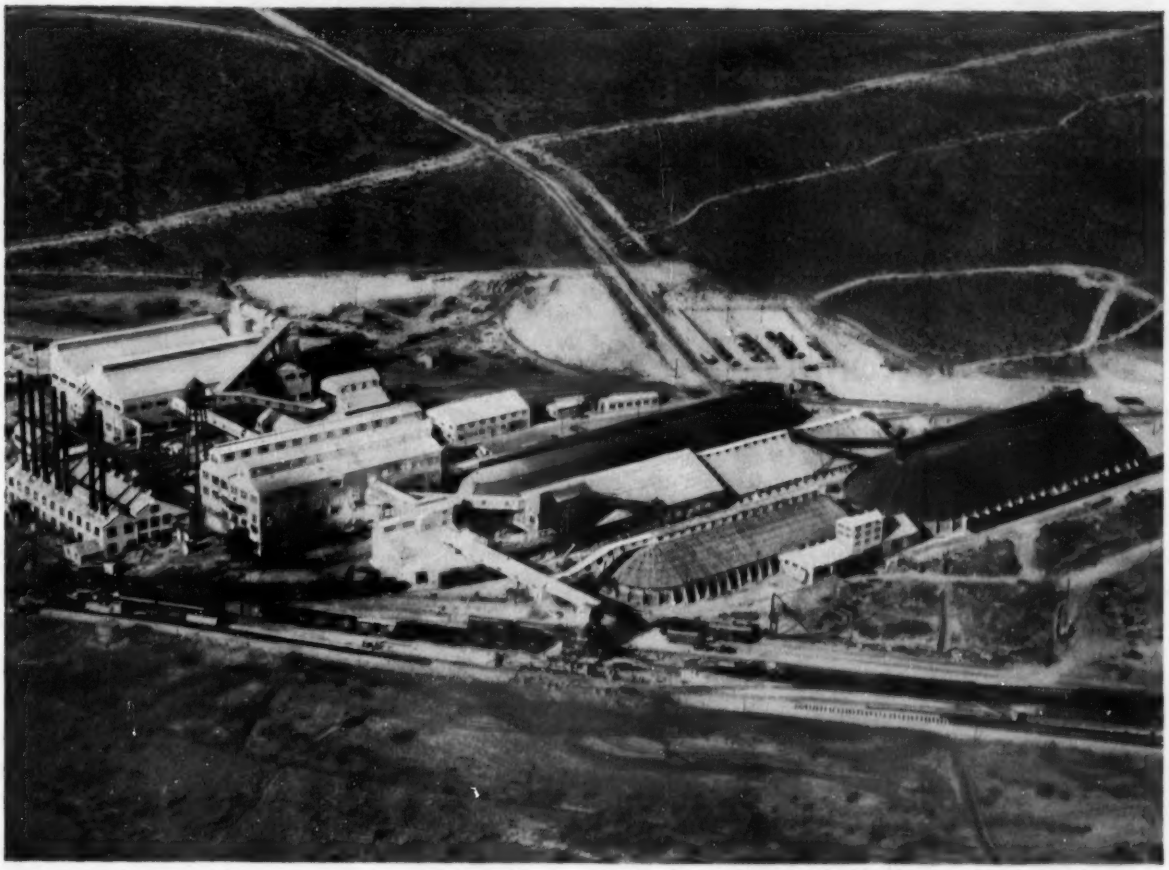
ROTARY COOLER

Highly efficient shell design for quick thermal release, with special feed and discharge breechings. Rotary seals prevent air losses.

EDW. RENNEBURG & SONS CO. Baltimore 24, Maryland, U.S.A.

* TVA Licensed Manufacturer

Literature and information on request.



The heart of USP's extensive operations is at Carlsbad, New Mexico. This ultra-modern plant stands at the site of the great potash mines in one of the most colorful sections of the Southwest.

EXTRA WAREHOUSES
EXTRA PROCESSING MACHINERY
EXTRA HANDLING FACILITIES

ADD UP TO EXTRA SERVICE FOR OUR CUSTOMERS

THE RECENT ADDITIONS to our plant facilities, completed early this year, were made primarily to improve delivery of our products to customers during peak months.

As a result, we have been successful in keeping deliveries completely up to date throughout the year.

Just as a good farmer returns part of his income to the earth in the form of fertilizers to assure better crops, so we have returned part of our income to increased plant facilities that will assure faster, more efficient service to our customers.

HIGRADE MURIATE OF POTASH 62/63% K_2O
GRANULAR MURIATE OF POTASH 60% K_2O MIN.

REG. U.S. PAT. OFF.

UNITED STATES POTASH COMPANY
INCORPORATED
30 Rockefeller Plaza, New York 20, N. Y.
Southern Sales Office
Rhodes-Haverty Building, Atlanta, Georgia



Edward Ryland who joined V-C in 1901 stopped by the home office in Richmond to point out features of one of V-C's first plants to Miss Pat Minor, right, a new employee, and Miss Margaret Davenport who has served with the company for 46 years. Ryland, now retired, served as vice president of the corporation which celebrated its sixtieth anniversary on September 12.

V-C Celebrates 60th Year

Virginia-Carolina Chemical Corporation has just celebrated its sixtieth birthday.

It was in 1895 that Samuel T. Morgan, a leader in the fertilizer industry from Durham, North Carolina, journeyed to Richmond to see his friend, S. Dabney Crenshaw, another prominent fertilizer manufacturer. From their meeting came the idea to combine the output of several firms for better service to the trade. Ultimately, the consumer was to benefit through lower fertilizer prices.

After months of negotiation, eight firms from Richmond, Petersburg, and Norfolk, Virginia, and the Durham firm merged to form V-C. Offices were set up in Richmond in the old Haxell-Crenshaw Warehouse, the site of a prison during the War Between the States, and immediately V-C was a going concern.

The early years of V-C history were marked by expansion, and soon the company had factories serving the entire South. V-C's fortunes have been bound closely with the farm economy. The company has shared in the farmer's prosperity and it has suffered with him the hard times of the early twenties and the early thirties.

Since World War II, an expansion program has brought diversification to the V-C Corporation. Its fertilizer plants and sales offices now serve farmers from the Rocky Mountains to the Atlantic and from Canada to the Gulf of Mexico. V-C has phosphate mining operations in Florida and Tennessee; Chemical plants in Florida, South Carolina and Ohio; a multiwall paper bag plant in Atlanta, and a textile bag plant and home offices in Richmond. At Taftville, Connecticut. V-C manufactures "Vicara" brand fiber from zein, the protein portion of corn.

ARKANSAS

National Farmer's Union has not yet chosen the site for the multi-million plant they propose to build. The choice seems to have switched from Georgiana, Ala. to somewhere in the vicinity of Helena, or perhaps this is just local pride speaking because **James G. Patton, NFU** president, says it will be 30 days or so before the decision is made. However, the proposal to build the plant in Arkansas is backed by the **Arkansas Farmer's Union**, and **J. Albert Hopkins**, AFU president, made the presentation.

NFU, in partnership with **Kerr-McGee** and **Phillips Chemical**, owns the largest known potash holdings in Carlsbad—15,000 acres which will be minded by the three concerns, the product to be distributed by **Resources Corp.**, an NFU subsidiary, which will also build the plant when the site is settled on. **C. E. Huff** is general manager of Resources; former Secretary of Agriculture **Charles F. Brannan** is NFU legal counsel.

CALIFORNIA

Best Fertilizer Co., Lathrop, will spend $50,000 to expand facilities. According to vice-president **C. W. Peterson**, the new installations will include expansion of aqua-ammonia facilities at Tracy, and a liquid fertilizer plant adjoining the Lathrop plant, where 50 daily tons of liquid fertilizer can be produced. **Al Roecks** is manager of the Lathrop plant.

* * *

Western States Chemical, San Francisco, will build at Nichols to produce pelletized fertilizer, according to **W. L. Dixon, Jr.**, general manager. Scheduled to be in production early next year, the capacity is rated at 200 daily tons. **E. W. Rowbotham** will manage the new plant. Nearby **General Chemical** will supply raw material.

Crown Zellerbach Corp., San Francisco, have announced a new agricultural mineral to correct iron chlorosis, made as a by-product of the pulp and paper making. To be marketed next year, the product was developed by **Dr. J. P. Bennett**, recognized as an authority on iron chlorosis and formerly with U of Cal. In collaboration with **C. Emlen Scott**, extension plant pathologist, he has been working on the product for two years and has field tested it on pears, peaches, prunes and other Western crops. It has been named **"Greenz 26"**.

* * *

Union Oil will duplicate its present sulphur recover unit at Santa Maria, which takes 50 daily tons of sulphur from refinery gases.

* * *

Pacific Coast Borax Co. division of **Borax Consolidated, Limited** is starting work to convert its present system of mining at Boron, to open-pit and to construct new concentrating and refining plants at such minesite.

Recent developments in technique and equipment now make possible the recovery of virtually the entire orebody at Boron by open-pit methods. Substantial increases in demand which have occurred since the war and the likehood of still larger requirements in the reasonable future make this project economically justifiable and, of equal importance, the improved ore recoveries which can be expected will greatly extend the life of the mine.

Since the character of the ore recovered by open-pit methods will be somewhat different from that hitherto obtained by more selective methods a substantial change in process had to be developed to yield optimum results. The new concentrating and refining plants to be erected at Boron will handle economically all grades and varieties of ore and will produce borate concentrates required for the export trade and the principal forms of refined Borax for domestic and foreign markets. These refined Borax products have hitherto been produced at the Company's refinery at Wilmington, California, some 135 miles distant from the mine. A substantial saving in freight will be made by producing these Borax products at the minesite. The productive capacity of the new plants will be substantially greater than for existing plants.

The new facilities will cost around eighteen million dollars to complete and are expected to be in operation around the second half of 1957.

Around the Map

FLORIDA

A Natural Gas pipeline, projected for Florida, according to word from the **Federal Power Commission** should mean more economical operation of present chemical operations now there, plus encouragement for new projects.

* * *

Florida - Georgia Industries, Inc. has established a bulk anhydrous plant at Lake City, with plans for future operations at other Florida and Georgia points. Each is to be equipped with custom application equipment, according to **A. G. Paul, Jr.,** president.

GEORGIA

Southern Nitrogen Company has announced a $14,000,000 petrochemical plant at Savannah to produce 250 daily tons of ammonia which will be converted to solutions and prilled ammonium nitrate. According to **John R. Riley,** president, construction of the plant will be started in the Fall and is expected to be in operation before the end of 1956.

Mr. Riley pointed out that the project will be the first synthetic nitrogen plant to be located in the large nitrogen consuming area comprising the south Atlantic states. Emphasizing its importance to that general area, Mr. Riley said that savings to farmers, and the fertilizer industry operating in the area, will approximate $3,000,000 annually.

Plans provide for a completely integrated plant of the most modern design which will include the ammonia plant and other units to produce nitric acid, urea, nitrogen solutions and fertilizer grade ammonium nitrate.

The new plant will employ about 200 with an annual payroll of approximately $1.000,000. Natural gas, which will be the principal raw material, will be supplied by **Southern Natural Gas Company of Birmingham, Alabama.** As projected, the plant will consume more than 3½ billion cubic feet of interruptible natural gas and 85 million kilowatt hours of electricity annually. Electric power requirements will be supplied by **Savannah Electric and Power.**

The company has completed arrangements for raising $18,000,000 in part through a long-term insurance company loan and in part through the sale of securities. The $4,000,000 remaining after allocating construction costs will be used for pre-operating expense and working capital.

In addition to Mr. Riley, organizers of the company include **Malcolm Smith,** chairman of the board, and **George V. Taylor,** vice president. Mr. Riley was formerly vice president in charge of sales and a director of **Spencer Chemical Company.** Mr. Smith, a limited partner of Dean Witter & Co., was formerly a partner of **J. H. Whitney & Co.** and **Glore Forgan & Co.** and a director of Spencer Chemical Company, **Rexall Drug Company** and **Byron Jackson Company.** Mr. Taylor was formerly director of product sales for Spencer Chemical.

Ideal By-Products, Lawrenceville, division of **Wilson & Toomer,** Jacksonville, Fla. has been established to produce fertilizers, with 20 employees.

ILLINOIS

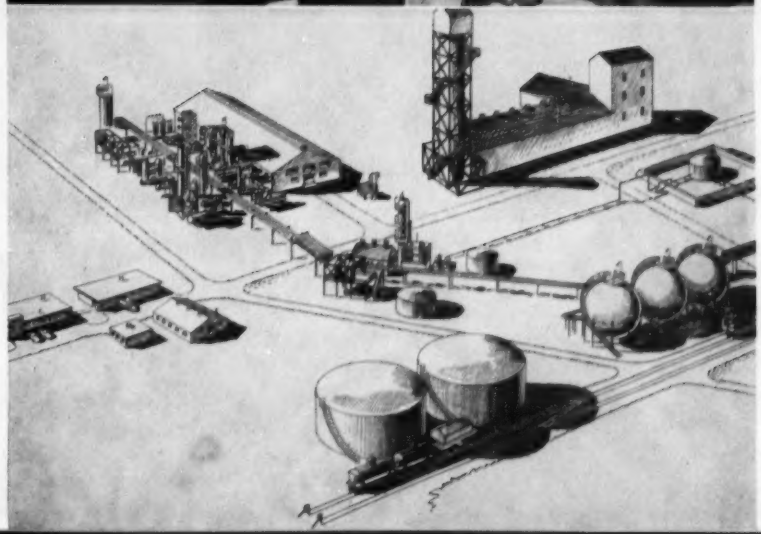
Illinois Farm Supply has announced a calcium metaphosphate type high analysis plant food, to be offered in granular form. **James Seymour** of their Collinsville laboratory is credited with the development of the new product.

* * *

Vermilion Nitrogen Corp., Fairmount, has been reorganized to permit an expansion program, with $45,000 in new stock authorized. They are putting in a new plant at

Messrs. Malcolm Smith, chairman of the board, John R. Riley, president, and George George V. Taylor, vice president of Southern Nitrogen Company and sketch of new $14,000,000 petrochemical plant to be built by them in Savannah, Georgia. The structure in the left background is the gas preparation plant where natural gas is converted into synthetic anhydrous ammonia and urea. The buildings in the center of the print are the nitric acid and nitrogen solutions unit. At upper right ammonium nitrate enters a "shot" tower in liquid form and is prilled. In center foreground are tanks for storage of nitrate solutions and to their right are Hortonspheres for ammonia storage. Behind the Hortonspheres is a fuel storage area. At the left of the picture are administration, laboratory and shop buildings. Shipment of all products is made either by rail or truck. Tankcar loading areas are shown in the foreground.





Bismark, and have plans for another at New Richmond, Ind. **Charles Miller** is president.

* * *

A completely new and very modern fertilizer plant has recently been put into production in open farm country about four miles west of Tuscola in central Illinois. This plant, designed and engineered by the Blaw-Knox Company, is designed to give a continuous flow of production from the original materials to bagged granular fertilizer.

H. E. Causly is general manager of the plant, which is owned and operated by the **Illinois Farm Supply Company**, an affiliate of the **Illinois Agricultural Association.** It was financed by a bond issue and these were sold almost entirely to Illinois farmers. The company's first venture in fertilizer production was a plant which is located in southern Illinois in the East St. Louis area. This old plant will continue to serve farmers in southern Illinois while the new plant will serve those in the cornbelt region of the central and northern part of the state.

The plans at present are to confine production to about four formulas as follows: 12-12-12, 5-20-20, 6-24-12 and 10-20-20. The new plant has a capacity of around 1800 tons of high analysis mixed goods for a 5 day week and is expected to turn out 50,000 annual tons production. This is to be handled by farm supply dealers who are equipped with storage space, distribution facilities and also spreading service in many cases.

IOWA

The Tiger Chemical Company, Onawa, is now engaged in a plant modification program which will give them added capacity and improved production efficiency in the manufacture of liquid fertilizer solutions. The company is adding an aqua ammonia converter, an ammonium phosphate cooker, and other equipment in their reactor circuit.

The modifications are under the supervision of the **J. C. Carlile Corporation,** Denver, Colorado, incorporating this firm's newest design features in neutral solution fertilizer production.

* * *

Continental Fertilizer's new plant, which should be in operation at Nevada as you read this, and which was reported here last month, was built for them by **J. C. Carlile Corp.,** Denver. It includes the installation of a complete and continuous automatic-control neutral solution plant to produce from 10 to 15 hourly tons of ammonium phosphate or formulated liquid fertilizers. Incorporated is a Carlile unit for conversion of anhydrous to a neutral aqueous ammonia solution at an efficiency reported as 99% plus.

* * *

Vorhes Chemical Corp. are putting into production their plant at Charles City, with a capacity of 20,000 annual tons of Big V fertilizer. **Harold Vorhes,** who heads the concern is a veteran fertilizer man.

* * *

Lenox Fertilizer Corp., Lenox, headed by **Russell Giles,** is building a plant to be ready by early December.

* * *

G & O Fertilizer Company has been organized at Cherokee to provide fertilizers, liquid, anhydrous and dry, and are building facilities, which will include application service. **A. R. Griffith** and **Gunnar Osterling** are owners.

* * *

Good Land N-82 Company, Bob Dubrow, president, is establishing a $70,000 liquid fertilizer plant in West Union.

* * *

Darling Fertilizer Co., Chicago have bought from **Barvin Bros.,** Waucoma, their rendering plant. Under the management of **Paul Knox** it will be improved and put on a 24-hour basis.

KANSAS

Deep Root Fertilizers Inc., has been established at Olathe, and expects to begin operations December 1. They will produce pelletized fertilizers, including trace minerals, turning out an estimated 30,000 annual tons. **Robert Bentinor** heads the concern.

LOUISIANA

Farm Service Inc., Opelousas, is installing an acidulating unit, using a cone mixer and continuous den, designed and furnished by **Davidson-Kennedy Company,** Atlanta, Georgia

MINNESOTA

Land O' Lakes Creameries, Inc. last month began the $350,000 expansion of its Minneapolis fertilizer plant which will nearly double output, and which will switch production to granular goods. Present tonnage is 40,000 annually and with the new facilities it will reach 75,000 annual tons capacity. The present plant will be converted to bulk storage, according to **C. W. Johnson,** general manager.

* * *

St. Paul Ammonia Products broke ground last month for their $16,000,000 ammonia plant at Pine Bend, which is to be completed late next year. **Robert Campbell,** of Vancouver, B. C. is chairman of the company which will construct and operate the plant. Capacity is rated at 200 daily tons of anhydrous, 200 of nitric, 213 of fertilizer solutions and 135 of solid ammonia nitrate. **Dan A. Williams,** of the **Farm Bureau Service Co.,** is president.

* * *

Smith-Douglas has added another $5,000 to the $6,000 gift to the University of Minnesota, which will permit high school graduates to study soil science. **M. W. Mahinney** of their Albert Lea plant presented the gift.

* * *

Hayden Farm Center, Worthington, has setup a liquid fertilizer plant with three 30-gallon tanks.

* * *

Chemical Plants Division of Blaw-

One of the largest high-pressure ammonia storage terminals in the United States has been placed in operation by Mid-South Chemical Corporation at Harlingen, Texas. The terminal includes a battery of sixteen 30,000 gallon tanks with unloading facilities for barges operating on the Intracostal Waterway. Ellis T. Woolfolk, president of Mid-South, said it will be the distribution center for a network of smaller distributing stations the company will establish immediately in the Lower Rio Grande Valley.

The terminal also has rail and truck loading facilities. The new terminal was built under contract by Edward S. Nelson Ltd. of Clarksdale, Miss.

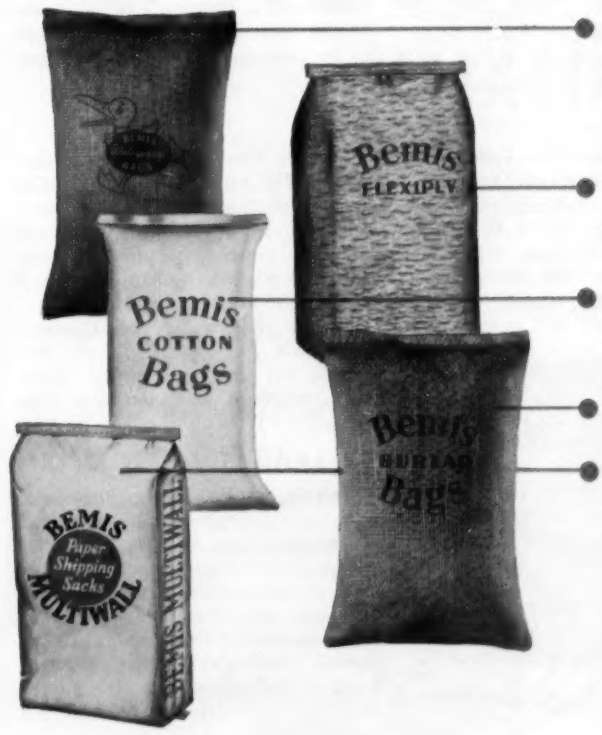
This is the second in a series of waterway terminals being built by Mid-South.



from A to Z

ammonium nitrate — *zinc sulfate*

fertilizers and ingredients travel economically in Bemis Bags



Which types of Bemis Bags? Here's a good yardstick . . .

Bemis Waterproof (laminated-textile) Bags if you have a really hard-to-pack fertilizer or fertilizer ingredient—one that requires special protection against moisture gain or loss, escape of odors, loss from snagging or tearing. This is the strongest shipping bag made—particularly suitable for export.

Bemis Flexiply Bags if you need a little less than the super-protection of Bemis Waterproof Bags. These laminated, all-crinkled paper bags are tough, shock-resistant, flexible . . . handle and stack easily.

Bemis Cotton Bags if you want a sturdy, attractive bag with sales appeal and top-brand reproduction. Bemis Cotton Bags, white or dress print, are popular for their secondary household uses.

Bemis Burlap Bags if you are after maximum mileage . . . durable and economical.

Bemis Multiwalls if you want quality paper bags with the best multicolor brand printing in the bag business.

Bemis

408 Pine St., Box 46
St. Louis 2, Missouri



Sackett Builds The Equipment You Need

★ **Continuous Granulating Units**

★ **Plant Modernization Programs**

★ **One Man Batch Weigh Systems**

★ **Mixing and Shipping Equipment**

Aerating Equipment
Automatic Control Equipment
Basing Units
Belt Conveyors
Bucket Elevators
Centralized Control Systems
Continuous Acidulating Processes
Continuous Ammoniating Systems
Conveyors
Coolers
Crushers
Disintegrators
Dry-Mixing Units
Dust-Arresting Equipment
Fume Scrubbing Systems
Hoppers and Spouts
Materials Handling Equipment
Milling and Screening Units
Multiple Hopper Batching Systems
Oil Fired Dryers
Plant Mechanization Systems
Pneumatically-Operated Gravity Batch Mixers
Pneumatically-Controlled Valves
Pulverizers
Sackett Timken Bearings
Sacking Units
Scales
Screens
Shipping Units
Shuttle Belt Conveying Systems
Tailing Mills
Vacuum Condensing Systems

GET THE RIGHT ANSWER TO YOUR PRODUCTION PROBLEMS *get Sackett*

SACKETT

THE A. J. SACKETT & SONS CO.
1727 S. HIGHLAND AVENUE
BALTIMORE 24, MARYLAND



Anhydrous ammonia will be more readily available for farm crop fertilization in four Mid-Eastern states as a result of the completion of a $175,000 expansion program by bulk plant operators in the area.

Twelve new bulk plants for the storage and distribution of anhydrous ammonia, have been installed in Indiana, Illinois, Wisconsin and Michigan, by Edward S. Nelson, Ltd. of Clarksdale, Mississippi. The twelve new plans, mainly 30,000 gallon installations, were built for bulk distributors in these areas, all anhydrous ammonia customers of the Olin Mathieson Corporation. The plant shown here is typical.

Knox Company is installing a 25 ton per hour granular fertilizer production unit for **Land O'Lakes Creameries** at Minneapolis. Process consists of continuously screening, weighing, and metering raw materials to a TVA-type ammoniator, granulation, drying, cooling and screening.

Also included in the project are a building to house the equipment, and storage facilities for anhydrous ammonia, nitrogen solution, sulfuric acid and fuel oil. Complete dust and fume scrubbing equipment is an integral part of the operation.

Construction will be completed before the year's end to permit production of all nitrogen grades of fertilizer for the '56 season. The existing batch mix system will be retained for use on non-nitrogen grades.

MISSOURI

Lion Oil is now a division of **Monsanto,** effective September 30. **T. M. Martin and T. H. Barton,** Lion president and chairman have become members of the Monsanto board. Mr. Martin has been elected a Monsanto vice-president and will serve as president of the Lion division. Lion's vice-president and general counsel, **Jeff Davis** is now an assistant secretary of Monsanto and Lion's vice-president and treasurer, **E. W. Atkinson** is an assistant treasurer of Monsanto.

• • •

MFA has purchased the **Farm Fertilizer Service,** Columbia, and will continue operations. The plant, built three years ago by **James E. Judah** will produce only bulk fertilizer. Granulating equipment will be installed. A spreader service will be offered. Mr. Judah will devote full time to his farm.

NEBRASKA

Agricultural Chemical and Supply Co., Geneva, have initiated production in their new liquid fertilizer plant, whch can turn out 16,000 daily gallons. They have storage capacity for 100,000 gallons additional. **John L. Sloane** is president.

• • •

The purchase of the **Platt Valley Fertilizer Co.** plant at Scottsbluff, has just been announced by the **J. R. Simplot Co.**

W. Grant Kilbourne, vice-president, Simplot Co. and general manager of the fertilizer division, announced that the Scottsbluff operation of Curry Chemical division of **Phillips Petroleum Co.** has been purchased by Simplot in a transaction consumated at Boise, Idaho, in the general offices of the Simplot company. Mr. Kilbourne asserted that the policies and personnel of Platt Valley Fertilizer Co. will remain intact under the new management. A Simplot manager, **C. E. Brissenden,** will take over the operation, however. Kilbourne further stated that the Platt Valley name and brand will be maintained under the new ownership.

NEW YORK

Stauffer Chemical and **Consolidated Chemical Industries Inc.** jointly announce that their directors have reached agreement on a plan to merge Consolidated into Stauffer, which will be submitted to the stockholders of both companies for approval. Total assets of the combined operation would be $120,000,000, and Consolidated would be continued in operation as a division. Stauffer holds all Class B voting stock of Consolidated, and was a prime mover in the formation, many years ago, of the Consolidated predecessor companies.

OHIO

The Du Pont Co. is starting construction of a new sulfuric acid plant near junction of the Ohio and Greater Miami Rivers. At this site about 20 miles downstream from Cincinnati, the plant is scheduled to start operations late 1956.

To be known as the **Grasselli Chemicals** department's **Fort Hill Works,** the unit will replace Grasselli's plant at Lockland near Cincinnati.

OKLAHOMA

Tulsa's multi-million-dollar sewage treatment plant made its first sludge run late last month and—according to the local press "possible sale of the material for fertilizer purposes was discussed by utility board members" the same day. **A. B. Jewell,** assistant water superintendent was quoted that the sludge was not especially satisfactory for



SACKETT "TUNED TO THE TREND" ENGINEERING SPEEDS PRODUCTION OF *Granular* MIXED GOODS

Whether you are planning to build a new plant for the production of granular mixed fertilizers or to convert your existing facilities for granular production, Sackett has exactly what you need in the way of know-how, process equipment and expert engineering and field management.

We are presently building Continuous Granulating Processes in 10, 15, 20, 30 and 40 ton per hour sizes. These capacities are based on a classified finished product.

We invite you to call us in for a consultation.

Superphosphate and mixed goods producers are invited to get our seasoned counsel on their expansion and modernization programs. It is available at no cost.

SACKETT BALTIMORE

America's Foremost Designers and Builders..

SUPERPHOSPHATE PLANTS · FERTILIZER MIXING PLANTS

RELATED PRODUCTION EQUIPMENT

THE A. J. SACKETT & SONS CO.,

1727 S. HIGHLAND AVENUE, BALTIMORE 24, MD.

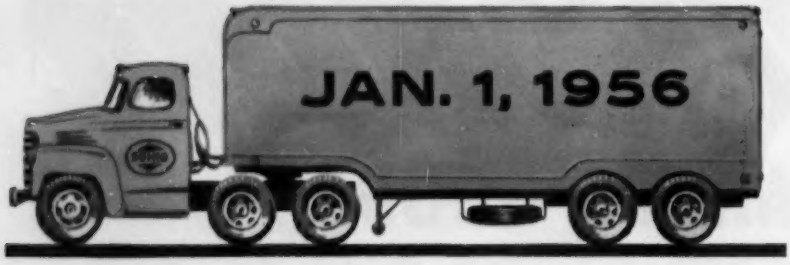
Architects and Manufacturing Engineers to the Fertilizer Industry since 1897

Your NEW SOURCE for Nitrogen Chemicals

Sohio Chemical Company







Our fleet of new aluminum or stainless steel tank cars and trucks will be ready to serve you starting January 1st, 1956.

Centrally located in the agricultural mid-west, Sohio Chemical Company offers you fast, low cost delivery. Our large storage facilities and extensive selection of nitrogen solutions can supply your most complex requirements.

AMMONIATING SOLUTIONS
ANHYDROUS AMMONIA
AQUEOUS AMMONIA
UREA (PRILLED)
NITRIC ACID
UREA-AMMONIA SOLUTIONS

SOHIO

SOHIO CHEMICAL COMPANY
LIMA, OHIO

fertilizer except when treated with nitrogen. "It does make good humus for lawns" he said.

* * *

Farmers Union Coop, Laverne, had not completed their new steel building when they decided to double it —so now it's to be 30 by 80 feet, and will nicely take care of their new fertilizer line.

* * *

Remwood Chemical Co., Tulsa, has completed its plant to formulate and market liquid plant foods and distribute dry fertilizers. **Dr. Ronald E. Meyer** is president.

* * *

Phillips Petroleum Company Bartlesville, in announcing the sale of the former **Curry Chemical Company** fertilizer mixing plant located at Scottsbluff, Neb., to **Simplot Soil Builders, Inc.,** Boise, Idaho, stated that their primary interest in the fertilizer industry is supplying raw materials to mixed fertilizer manufacturers and bulk ammonia distributors rather than selling at the dealer and retail level.

Phillips acquired this plant when it purchased the Curry Chemical Co., November 1954.

TEXAS

Ferti-Nur Mfg. Co. is in production with a liquid sheep manure fertilizer, operating at present from the ranch of **P. J. Reeves,** who, with **Robert L. Jones** launched the venture. They also make "pot inserts" which are a cake form of sheep manure, shaped to fit into flower pots and calculated to supply complete plant food for the life of the plant or flower inserted.

* * *

Preliminary plans for moving the Houston research laboratory of **Consolidated Chemical Industries, Inc.** into its new home in Peiser Park opposite the Manchester plant have been set by the lab's research director, Dr. H. Zeh Hurlburt. Primary purpose is to provide better and additional facilities for CCII's continuous research for new products, as well as for process and product improvement.

VIRGINIA

Farmers Cooperative Fertilizer Purchasers Inc. late last month suffered a fire which was set at $200,000, partially covered by insurance. **W. S. Manson Jr.,** secretary treasurer, announced they would start rebuilding immediately and would have fertilizers on hand within a few days.

WASHINGTON

Chas. H. Lilly Co., Seattle, have produced an already prepared compost for enriching flower and vegetable gardens, lawns, shrubs, greenhouse beds, house plants and farm plots, according to **Lee Fryer,** fertilizer division manager. It has been named "Miracle Mix", and is sold in a variety of sizes for house-plant packages to bulk sacks.

AFRICA

North African phosphate rock, a professor at University of Algiers announces, contains 100 grams of uranium per ton which can be extracted during superphosphate production.

* * *

South Africa is considering a fertilizer plant at Sukulu, where phosphate deposits make it a practical location. **J. T. Simpson** is head of **Uganda Development Corporation** which is making efforts to develop these deposits.

CHILE

Anglo-Lautaro Nitrate Co. was the first of Chilean nitrate concerns to go on record with an expansion program since the new measures, favoring nitrate exports, were announced. They are prepared to invest $25,000,000 in promotion of Chilean operations.

MEXICO

Industrias Quimicas is working toward a 100 daily ton sulphuric acid plant in Michoacan. Plant site has not yet been selected.

* * *

Pan American Sulphur are expanding their Jaltipan sulphur facilities, with completion slated for the middle of next year.

MOROCCO

Khouribga phosphate installations were damaged, to the extent of $4,000,000 and two months shut-down for repairs, during the recent disorders.

PERU

Fertilizantes Sinteticos S. A. has signed an agreement with **Montecatini** for technical aid in the construction of the $7,000,000 nitric acid and nitrogenous fertilizer plant which is being financed by **Banco Commerciale de Milan.**

TURKEY

Badische Anilin Chemical, Essen, Germany, has announced that construction is under way in Kutahiya on the 110,000 annual ton fertilizer plant they are building.

New Sales Offices For Nitrogen Div.

Two new sales offices for agricultural products have been opened by the Nitrogen Division of Allied Chemical & Dye Corporation. One is at Kalamazoo, Michigan, and the other at Columbia, Missouri.

The Kalamazoo office, located at 511 East Paterson St., is shared with Allied's General Chemical Division. The Columbia office is located at 20A South 9th St.

Nitrogen Division's Los Angeles office, which was opened a year ago, has been consolidated with the General Chemical Division Los Angeles office and moved to 2999 West 6th St.

Alaskan Phosphate Deposits Found

The first reported occurrence of phosphate deposits in Alaska has been announced by the Geological Survey of the U. S. Department of Interior. The deposits, which occur at several localities on the Arctic slope of Northern Alaska, were discovered during the course of geologic mapping of Naval Petroleum Reserve No. 4 and were studied in greater detail during the summer of 1953. Sampling has revealed that the beds vary in thickness from 2 to 25 inches, with some containing as much as 30 percent P_2O_5, although the over-all phosphatic zone appears to average only about 10 percent P_2O_5.

The phosphate deposits are several hundred miles north of the nearest rail and road systems. Aircraft provide the only practical means of transportation to the region. The nearest settlements with permanent airfield facilities are 80 and 100 miles away although there are nearby lakes suitable for landing small planes.

Copies of the report, entitled "Phosphate Deposits in Northern Alaska," are available for examination at various Geological Survey offices in Washington, D. C., California, Utah, Colorado, Washington, and Alaska.

Nitroparaffins Now At Commercial Solvents

The world's first full scale nitroparaffins production facilities are now in operation at Commercial Solvents Corporation's Sterlington, Louisiana, plant, it was announced last month by J. Albert Woods, president.

Personals

Austin Richins, has been promoted to the position of assistant sales manager of **J. R. Simplot Co.,** fertilizer division, according to an announcement made by **Ben D. McCollum,** sales manager. Mr. Richins has been employed by J. R. Simplot Co. since 1946.

Dr. G. L. Bridger, consultant on fertilizer production and head of the Department of Chemical and Mining Engineering of Iowa State College, who has joined the Davison Chemical Company, division of W. R. Grace & Co. as Director of Agricultural Research. Vincent Sauchelli, agricultural authority of long association with Davison, has been named Chief Agronomist of the company.



Spencer Chemical Company has announced the appointment of Kenneth A. Keith, pictured, to the position of manager of Agricultural Chemicals Market Research, in a move for greater specialization in the department. Mr. Keith has been with Spencer eight years.

The election of Dr. Franklin D. Murphy, Chancellor of the University of Kansas, not shown, as a director of Spencer Chemical Company has also been announced.





Plant Food Corporation, Los Angeles, has recently completed a merger with the Charles E. Duggan Company, Pomona and Riverside, California, distributors of agricultural chemicals. Mr. Duggan, shown here, is well known in Western agricultural circles, has been retained to supervise the Pomona division.

Frank M. Ewer, director of the Boston burlap department of **Bemis Bro. Bag Company,** retired September 30 after 59 years of service with the company. Mr. Ewer, who is a vice-president and a director, joined Bemis in 1896.

* * *

American Potash & Chemical Corporation has announced the appointment of **Henry De Armond** as assistant to the company treasurer, **L. A. Adams,** at the company's Los Angeles headquarters.

* * *

Rudy Peterson has joined the company as senior process engineer and **Karl Wahl** was named as a technician assistant in the company's Engineering Department.

* * *

Dr. John W. Sites, horticulturist at the **Citrus Experiment Station,** Lake Alfred, has been named assistant director and horticulturist at the **University of Florida Agricultural Experiment Stations** in Gainesville. He assumed his new duties October 1.

* * *

The American Agricultural Chemical Company announces the appointment of **Dr. G. H. Benham** as director, research and process development, with headquarters in the company's New York office. Dr. Benham was previously associated with the **Armour Research Foundation** of the **Illinois Institute of Technology.**



William E. (Bill) Jones formerly with International Minerals and Chemical Corporation in their East Point, Georgia pilot plant laboratory has joined the staff of Northwest Cooperative Mills, Inc., fertilizer division. He is in charge of research development and production of granular high analysis fertilizers.

F. L. Munger, vice-president and sales manager of **Kraft Bag Corporation,** announces that **Ed Burgers, Jr.,** for over 3 years sales representative in the St. Louis area, has been assigned to the New York office to concentrate on new business development in Metropolitan New York and New York State. His replacement in St. Louis is **Frank C. Joos, Jr.,** for almost 10 years with Bemis Bros. at Peoria, Ill. Mr. Joos will cover the states of Missouri, Southern Illinois, Eastern Oklahoma, and Arkansas, reporting to Dean Wellington, Western Sales Manager in the Company's Chicago office, Daily News Bldg.

Other appointments and announcements by Kraft Bag include:

R. F. Floyd, formerly with **Union Bag,** covers New England and Metropolitan New York, working out of the New York office.

R. E. Kunze, formerly with **Fulton Bag,** represents Kraft Bag in Kansas, part of Iowa, Northwest Missouri, Central and Western Oklahoma. His headquarters are in Kansas City, reporting to **Dean Wellington,** Western sales manager in Chicago.

R. A. Kurlander, formerly with **Westinghouse Mfg. Co.,** has joined the Company's Kraftpacker sales division as field engineer on packaging machinery in the southernmost states, operating out of Montgomery, Alabama where the Kraftpacker Open Mouth Bag Filling Machine is manufactured. Kraft Bag Corp. is sole sales agent for this machine.

* * *

Laurance S. Rockefeller has been elected a member of the board of directors of **Olin Mathieson Chemical Corporation,** according to an announcement by **John M. Olin,** chairman of the board, and **Thomas S. Nichols,** president. Mr. Rockefeller is president of Rockefeller Brothers, Inc., an investment and research organization.

* * *

Miguel Tegtmeyer has resigned as

United States Potash announces the following appointments effective October 1, 1955: John E. Fletcher, right, has been appointed assistant sales manager. He joined the Company in 1949 and has served as sales representative in the southeastern territory and most recently in the midwestern territory. L. Ralph Boynton has been appointed Southern sales manager and will continue to operate from the Atlanta office where he has been Manager since September 1945.







One sharp pull – and you have a smooth, clean multiwall opening for precision-pouring. The smoothest bag opening feature available – either for sewn valve or sewn open mouth bags – is the new A&S Zip Top bag.

Wasteful "buckshot" pouring is eliminated because Zip Top – *with almost* no effort – provides a clean, controlled opening to empty all of its contents. Economy and customer-satisfaction are assured all around.

The new Zip Top feature is added to the other A&S multiwall advantages. You get outstanding colorful designs – clean, sharp printing – specification bag paper supplied by 4 big mills – the best possible combination of research and services. A&S customers are assured the experience and imagination of "the oldest name in paper bags" – almost a century of dynamic packaging and merchandising know-how.

To learn more about Zip Top – and other important special-packaging advantages–address the Package Engineering Department, Canajoharie, New York

A&S

ARKELL and SMITHS

500 Fifth Avenue, New York 36, N. Y.

"THE OLDEST NAME IN PAPER BAGS"

*Patent applied for.





L. L. Jaquier, Jr., left, and Robert S. McConnell have been named to positions in Phillips Petroleum Company's fertilizer sales division offices at Bartlesville, Oklahoma, where the company's headquarters are located.

Mr. Jaquier, formerly assistant manager of Phillips Kansas City sales division, has been appointed manager of material sales for the fertilizer sales division. Mr. McConnell was assistant manager of Phillips Wichita sales division until his new appointment as coordinator of fertilizer sales.

president of the **Synthetic Nitrogen Products Corporation** with which he has been associated since 1933.

* * *

F. T. Winters, Jr., manager of **Pacific Coast Borax Company's** agricultural sales division, has announced the appointment of two additional sales representatives in the United States.

Joseph S. Gowland, is assigned to the Company's office at Chicago. He will handle weed control and other products of the division in a portion of Illinois, Indiana and lower Michigan.

Elmer H. Schmierer, will be working out of the agricultural sales division's district office at Kansas City, Missouri. Mr. Schmierer will do sales contact work in Nebraska and Missouri.

* * *

Consolidated Chemical Industries Inc. has promoted **A. L. Sweitzer** to purchasing agent of the Southern division at Houston, Texas, replacing **W. G. Roberts** recently retired; and **E. J. Creider** to assistant plant manager at the Fort Worth, Texas, acid plant. He is moving from Little Rock, where he was in charge of Consolidated's activated bauxite plant and mines.

* * *

Robert C. Hills has been elected executive vice president and a director of Freeport Sulphur Company.

* * *

R. Kirby Shirley and **Pearson E. Neaman** have been elected senior vice presidents of **Freeport Sulphur Company.**

Mr. Shirley is treasurer of the company, has been with Freeport since 1922; Mr. Neaman is general counsel of the company, joined Freeport in 1930.

Dr. Ralph M. Hixon, Dean, Graduate College at Iowa State College, Ames, Ia., was named first winner of the Charles F. Spencer Award for



Robert J. Engelhardt has joined the J. C. Carlile Corporation as a vice-president, and has just been sent to Atlanta, Ga., for the opening of a sales and engineering office which he will manage and from which the company will service the East Coast and Gulf Coast states. Mr. Engelhardt is familiar with the territory, having spent the years since 1946 in Atlanta, Newark, and New York City as a chemical engineer.



S. A. Guerrieri who has been appointed to the technical staff of The Lummus Company, 385 Madison Avenue, New York 17, N. Y. Announcement was made by J. F. Thornton, president.

meritorious contribution to the field of agricultural and food chemistry.

Dexter French, Associate Professor of Chemistry at Iowa State College, nominated Dr. Hixon because of his distinguished record as an educator and his research work on the chemistry of corn. This research proved that the chemical properties of a plant could be changed by natural breeding processes instead of by a manufacturing process after the crop is harvested.

* * *

Solomon Epstein, executive vice president of **Emulsol Chemical Corporation,** division of **Witco Chemical Company,** has been assigned the duties of general manager of the company. **Dr. Charles Fuchs,** formerly chief chemist, has been elected to the position of vice president in charge of research and development. **Herbert Schoenfield** recently of velsicol chemical corporation has rejoined Emulsol as manager of technical sales service.

* * *

Dr. Roger Bart has been appointed manager of **International Minerals & Chemical Corporation's** Research Experiment Station at Mulberry, Florida, according to an announcement by **Dr. Paul D. V. Manning,** vice



Walter C. Ronk, vice-president of Barnard and Leas Mfg. Co., Inc., Cedar Rapids, Iowa, manufacturer of grain and feed processing equipment, announces the expansion of Barnard and Leas facilities to include agricultural and general chemical processing plant design and manufacture.

W. R. (Steve) Stephens, shown here, who has specialized for many years in chemical processing plant design and operation, has been named manager of the department. He is currently directing the development of B & L "package plants" for producing neutral solution fertilizers. Mr. Stephens comes to Barnard and Leas from Trenton Chemical Company, Trenton, Michigan where he was general manager and treasurer.

president in charge of the corporation's Research Division.

Dr. Manning also announced the appointments of **W. B. Williams** as supervisor of chemical process development and **F. N. Oberg** as supervisor of coordinating services at the Florida experiment station.

Davison Publishes Sauchelli Brochure

Davison Chemical Company Division of W. R. Grace & Co., has published a 32-page brochure on "Soils, Phosphates and Fertilizers" by Vincent Sauchelli, the company's agronomist. It deals with fertilizer chemistry in layman's terms, and is addressed, in the author's words, to "salesmen, farmers, and laymen in general to give in simple, understandable language some essential, practical information on the feeding of soils and crops."

Mr. Sauchelli discusses kinds of soil, what soils contain moisture supply, water requirements of crops, controlling soil moisture, how plants feed, chemical fertilizers and soil fertility, plant constitutents, plant nutrients, humus, commercial fertilizers and soil ammendments, secondary and trace elements, using fertilizers, fertilizer materials, phosphates, and the relative value of phosphatic fertilizers.

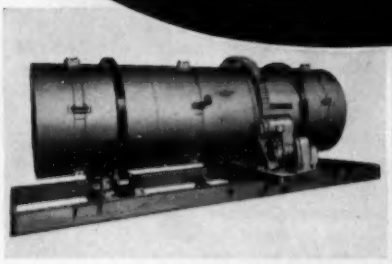
OBITUARIES

Sheppard R. Cooke, secretary F. S. Royster Guano Co., died suddenly of a heart attack late last month at his Norfolk, Va. home.

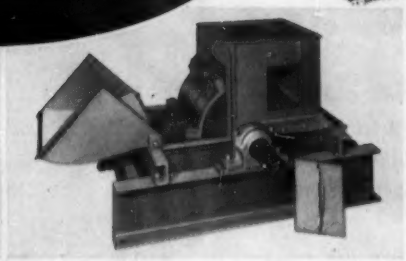
Dr. Robert M. Salter, chief, Soil and Water Research Conservation Branch, A.R.S., USDA, Beltsville, died suddenly Sept. 13.

STURTEVANT FERTILIZER EQUIPMENT

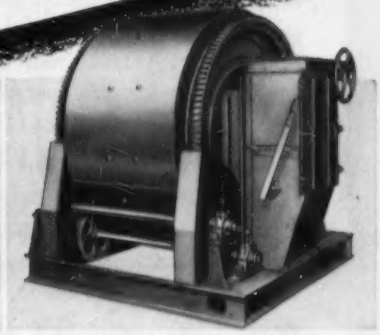
CUTS Cost of Fertilizer Manufacture



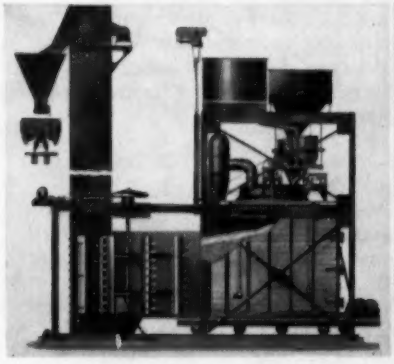
STURTEVANT FERTILIZER GRANULATING UNITS provide you with a complete process for manufacturing granular fertilizer. These efficient units can be supplied for various hourly tonnages and certain granule sizes depending on your particular requirements.



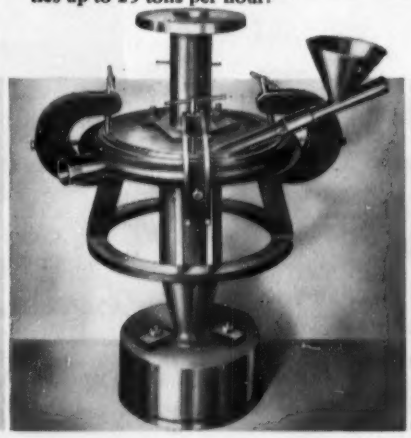
TAILINGS ROTARY PULVERIZER — increases output of fertilizer tailings . . . will not clog . . . leaves no daily accumulation of unground pellets. Capacities up to 25 tons per hour.



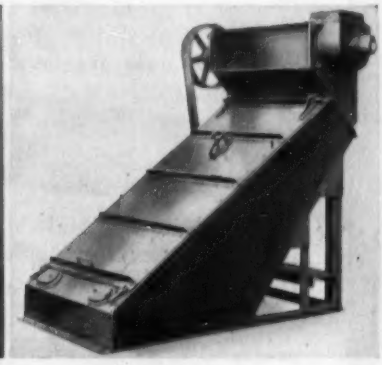
DRY BATCH MIXERS — 4-way mixing action mixes two or more ingredients into an inseparable, homogeneous blend. Open door accessibility makes cleaning easy. Capacities ¼ ton to 2 tons.



DEN AND EXCAVATOR—speeds processing of superphosphates. Easily operated by two men . . . produces 16 to 40 tons per batch and up to 480 tons per day of superior fertilizer free from lumps.



MICRONIZER® GRINDING MACHINE — A fluid jet grinding machine, the Sturtevant Micronizer speeds reduction of materials to low micron sizes. These jet mills are especially applicable in fields where a particle size in microns is desired.



MOTO-VIBRO SCREENS — screen everything screenable. Open and closed models with or without feeders. Many types and sizes . . . screens from ½" to 60 mesh.

For over 72 years, the Sturtevant Mill Company has been a leader in the design of plants and manufacture of fertilizer equipment. Equipment that has cut costs, increased tonnage throughout the industry.

Whether you plan to build a new plant, modernize or buy new equipment, it will pay you to consult Sturtevant Mill. Our engineers, specialists in fertilizer manufacture, are available for consultation. Ask for their services, today. You will keep ahead with Sturtevant.

STURTEVANT MILL COMPANY

111 CLAYTON STREET
BOSTON 22, MASSACHUSETTS

Designers and Manufacturers of:
CRUSHERS • GRINDERS
SEPARATORS • CONVEYORS
MECHANICAL DENS and EXCAVATORS
ELEVATORS • MIXERS

MR. FERTILIZER EXECUTIVE:

We know it is your desire and purpose to provide your customers with the most efficient fertilizer your "know how" and agricultural science indicates . . . BUT are you accomplishing this?

To answer YES, your fertilizer should contain ADEQUATE CONCENTRATIONS in a READILY AVAILABLE FORM of the ESSENTIAL TRACE ELEMENTS such as Copper, Manganese, Zinc, Iron, Magnesium and Boron.

If the essential trace elements are not present in adequate concentrations, you are not offering your growers a COMPLETE PLANT FOOD.

Join the ranks of the LEADING PROGRESSIVE FERTILIZER MANUFACTURERS . . . BOOST your SALES and FURTHER the MIXED GOODS INDUSTRY by manufacturing even better mixed fertilizers.

MAKE YOUR CUSTOMERS THE BEST PRODUCT POSSIBLE

Let TENNESSEE CORPORATION talk with YOU about our MINERAL MIXTURES program. The INEXPENSIVENESS and EASE of adding TRACE ELEMENTS should not be overlooked by progressive, PROFIT minded management.



Samples, specifications and detailed information on request.

TENNESSEE CORPORATION

617-29 Grant Building, Atlanta, Georgia

CFA

(Continued from page 25)

Officers

B. H. Jones, President; Wm. E. Snyder, Vice President; Virgil A. Frizzell, Secretary; Jack Baker, Treasurer; Sidney H. Bierly, Executive Secretary and Manager.

Board of Directors

Jack Baker, Fred R. Bryant, Howard G. Conley, Virgil A. Frizzell, Howard H. Hawkins, B. H. Jones, Murray C. McNeil, James M. Quinn, Wm. E. Snyder.

Convention Committees

Program

William H. Hewitt, Chairman; Wilson Meyer, M. M. Stockman.

Entertainment

Lisle W. Garner, Chairman; George P. Bloxham, Marion N. Crady.

Ladies

Mrs. Lisle W. (Edna) Garner, Chairman; Mrs. George P. (Jessie) Bloxham, Mrs. Mildred E. (Pheme) McCollam, Mrs. Arthur W. (Grace) Mohr.

PROGRAM FERTILIZER CONFERENCE

Buena Vista Hotel, Biloxi, Mississippi

October 26, 27, 28, 1955

Wednesday, October 26

3:30 P.M. Registration in Hotel Lobby

4:00 P.M. Advisory Committee Meeting

7:00 P.M. Banquet—Si Corley, presiding
Address by James D. Arrington, humorist, philosopher, etc.

Thursday, October 27

9:00 A.M. Continued Registration in Hotel Lobby

9:30 A.M. Business—Presiding: C. Dale Hoover

10:00 A.M. Opening Remarks—C. Dale Hoover

10:05 A.M. Soil Fertility Levels in Mississippi Soil Test Summary and Interpretation—
L. E. Gholston and J. D. Lancaster

10:45 A.M. Possibilities for Increased Effective Use of Fertilizers—

Corn	H. V. Jordan
Cotton	J. D. Lancaster
Pastures	L. N. Wise
ASC Program, 1956	C. W. Sullivan

11:45 A.M. Where Do We Go From Here With Fertilizer Analysis and Solubility of Phosphates?—W. B. Andrews

6:30 P.M. SHRIMP JAMBOREE

Friday, October 28

9:30 A.M. Business—Presiding: W. R. Thompson

10:00 A.M. Tailor-made Plants Use More Fertilizer More Effectively—

Corn	R. C. Eckhardt
Cotton	W. L. Giles
Small Grains	D. G. Wells
Forage Crops	H. W. Bennett

11:10 A.M. Brief Progress Reports on:

Five-acre Cotton Contest	T. M. Waller
Five-acre Corn Contest	W. R. Thompson

11:35 A.M. Carry-over of Nitrogen. Past Experience and Progress Report of Current Research—Perrin Grissom

11:55 A.M. Closing Remarks—Si Corley

The program for Thursday afternoon and Friday morning will be handled by State College, in the form of a Fertilizer Short Course, patterned after the 1954 meeting.

There will be a registration fee of $2.00, except for agricultural workers. John T. Caldwell, Jr. is treasurer of registration fees, and will serve as Chairman of The Reception Committee. You are asked to make your own reservation at the Buena Vista Hotel.



Have you heard

the Story of the

TONGUE-TIED TRAVELING SALESMAN?

NO, IT'S NOT the kind of story that you might suspect.

It's a sad story of the shipping sack that simply couldn't talk . . .

. . . the sack that, because of dull, lifeless printing, failed to "sell" the company's name and the merits of its product.

But, fortunately, we had a cure!

Through the application of our exclusive Kolorseal process, we produced bright, friendly, durable colors that *talked right out* and made a memorable impression on all.

Make the most of the advertising possibilities of *your* shipping sacks. Send for proof of Kolorseal's magnetic sales appeal. There's a Raymond man nearby. Write or call.

THE RAYMOND BAG COMPANY
Middletown, Ohio. Phone 2-5461

Raymond

MULTIWALL PAPER SHIPPING SACKS

GRANULATION

IS NOW POSSIBLE FOR ANY SIZE FERTILIZER PLANT

Increase your fertilizer profit now by producing highest quality granular fertilizer with a Blue Valley Granulator. Only a Blue Valley Granulator offers you—

- Lowest First Cost
- Lowest Installation Cost
- Lowest Operating Cost

Write, wire, or call us now—

BE WISE— GRANULATE THE GLASPEY WAY

Blue Valley

EQUIP. MFG. & ENGR. CO.
LAURENT AND N. TAYLOR
TOPEKA, KANSAS

INDUSTRY CALENDAR

Date	Organization	Place	City
	1955		
Nov. 2-3	Pacific N.W. Plant Food	Pilot Butte Inn	Bend, Oregon
Nov. 7-8	California Fertilizer Assn.	Mark Hopkins Hotel	San Francisco, Cal.
Dec. 5-7	Ag. Ammonia Institute		Kansas City, Mo.
	1956		
Jan. 4-6	Weed Society of America	New York Hotel	New York, N. Y.
Jan. 16-18	Sou Weed Conf.	Jung Hotel	New Orleans, La.
Feb. 6-8	Sou. Ag. Workers	Biltmore	Atlanta, Ga.
Feb. 15-17	Western Weed Control Conf.	Univ. of Calif.	Davis, Calif.
Mar. 4-5	Sou Safety	Biltmore Hotel	Atlanta, Ga.
June 28-30	Sou Control		Roanoke, Va.
June 28-30	Pacific N.W.		Yakima, Wash.
July 18-20	SW Grade	Bucaneer Hotel	Galveston, Tex.
July—	Eastern Canada		Mont Tremblant, Que.
Oct. 19	Control Officials	Shoreham	Washington, D. C.

General Metals Adds N Equipment

Two additions to their lines of Nitrogen Solutions equipment have been announced by General Metals, Inc., of Greensboro, N. C. Both of the new items come in their Speedy-Spread line of field applicator units.

Their "Broadcast Spray" applicator is designed for use interchangeably with the 21-foot boom on either the tractor or trailer-mounted Speedy-Spread applicator.

Their other new item in field applicator equipment is a low cost, gravity-flow, tractor-mounted applicator unit. Designed for use with a regulator cultivator, plow tubes are furnished with the unit for attachment to the cultivator shanks.

St. Regis Adds Pouch To Multiwall Bags

St. Regis Paper Company announces the development of a new multiwall paper bag feature which makes it possible to enclose printed instructions or sales promotional material in a pouch in the bag. The printed material can be inserted in the "literature pouch" in the back of the bag and easily removed by the consumer through tearing the plainly marked tab.

Insertion of the literature is a separate operation which can be performed in the St. Regis bag plant, or in the customers' plants if open mouth bags are used.

Arkell & Smith Installs New 5 Color Press

Arkell & Smiths, recently installed a new 5 color press in its Canajoharie, New York plant. Designed for printing with heat set inks, the press can run high quality gloss registration work at speeds up to 500 feet per minute. This new equipment will provide letterpress printing for specialty bag customers.

Link-Belt Approves Purchase of Syntron

Stockholders of Link-Belt Co., Chicago, have approved the purchase of Syntron Co., Homer City, Pa., subject to approval by Syntron shareholders and the Securities and Exchange Commission.

Syntron makes electro-magnetic equipment used in conveyor systems, selenium rectifiers for welding, radio and TV, and diesel-powered pile drivers. The company will operate as a subsidiary of Link-Belt under its present management, if the purchase is approved.

Schelm Brothers, Inc., of East Peoria, Ill., are now manufacturing and distributing the nitrogen solution applicator originally designed and engineered by W. A. "Red" Senesac.

Now known as the Senesac-Schelm "Do-It-Yourself" Applicator, it comes equipped with 100" tool bar and four knives. Tool bar extensions and extra knives are available to give 160" row coverage with any desired knife spacing.

They have also announced a new versatile Nitrogen Solution Transport Unit, which consists of a 500 gallon aluminum pressure Tank and Skid mounted on a two wheel trailer.

Complete information and prices on these units may be obtained by writing Schelm for their new 1956 catalog.



For Bagging **— CHI-ORGANIC —** *For Mixing*

(Chicago Activated Sludge)

"THE ALL-ORGANIC PLANT FOOD WITH THE BUILT-IN CONDITIONER"

CHICAGO FERTILIZER COMPANY

Exclusive Sales Representatives

ALEX. M. McIVER & SON

P. O. Box 155 Charleston, S. C. Tel. 3-4828-29

LEAD LINED EQUIPMENT

or

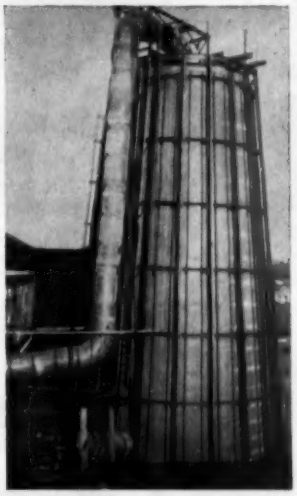
Construction

of

Complete

Acid

Plants



Southern Lead Burning Co.

ATLANTA 2, Ga.

P. O. Box 4627 Tel. WAlnut 2576

Low Costs

with

FUR-AG®



the sterilized organic conditioner

For years . . . First Choice of Leading Fertilizer Manufacturers

Fur-Ag is an inexpensive organic conditioner that is produced in volume and shipped to you *on schedule* the year around. Fur-Ag reduces bag set, promotes drillability, speeds up curing in the pile and provides bulk. It is sterilized—free from plant diseases, insects, weed seeds—and being dark in color makes a rich-looking piece of goods. Write today for complete information—Bulletin 127.

The Quaker Oats Company

CHEMICALS DEPARTMENT

345 The Merchandise Mart, Chicago 54, Illinois

Lancaster, Allwine & Rommel

Registered Patent Attorneys

Suite 428

815—15th STREET, N. W.

Washington 5, D. C.

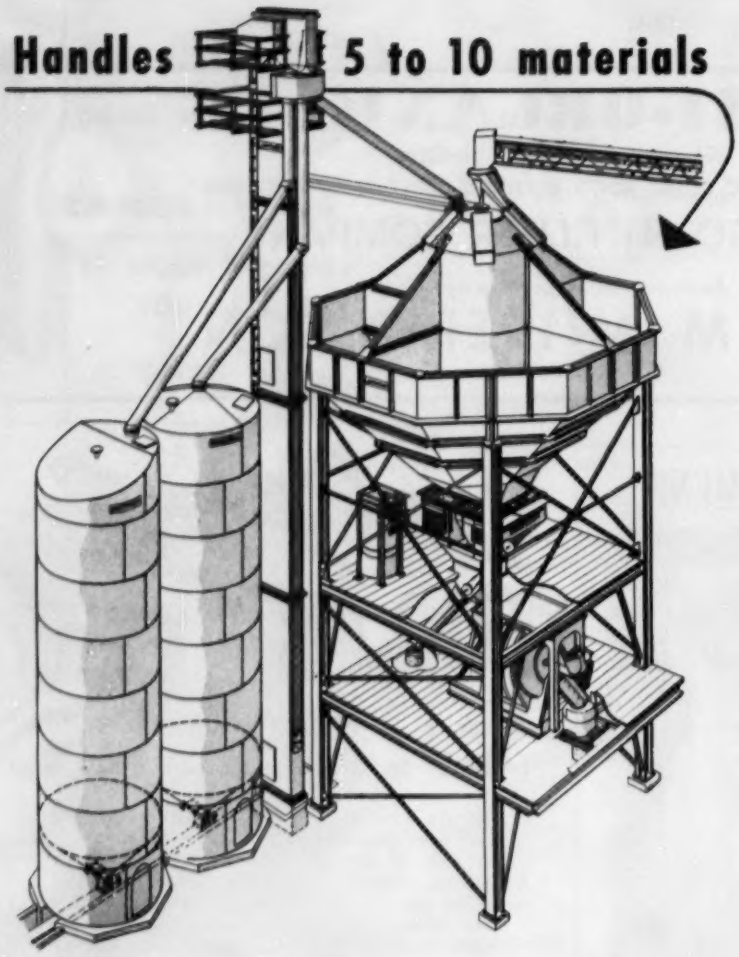
Patent Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions.

Booklet and form "Evidence of Conception" forwarded upon request.

F-SERIES BULK CONVEYORS



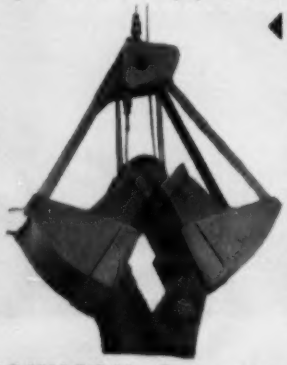
Handles 5 to 10 materials



Bin capacity: 150 to 1100 cubic yards

On fertilizer blending operations, multiple ingredients are instantly available with this Johnson Octo-Bin plant. Overhead storage bin has 4 to 8 compartments arranged around a centrally-located tank having 1 or 2 compartments. Tank is charged by chute from bucket elevator. Open bin compartments can be charged by a second elevator or belt conveyor, with pivoted distributor for feeding materials into proper section of bin.

Plant can be arranged with clod-breaker, vibrating screen and collecting hopper for pulverizing and screening materials before they are fed into the bin. Single or multiple material batchers, with manual or automatic controls, accurately weigh materials at high speed, and discharge into mixer for final blending operation. Let us show you how this multiple-material plant can be adapted to meet your specific requirements. Several other types and sizes of Johnson plants and accessory equipment also available.



Fertilizer buckets —

To stockpile, load and unload chemicals, fertilizers, and other fine-grained materials, Johnson brings you a special clamshell bucket. All-welded, smooth inside and out, it loads fast — gives quick, clean dump. Powerful closing action of hard manganese cutting lips prevents load leakage as you hoist and swing the bucket. 10 wide-rehandling sizes: ¾ to 3 cu. yds. See your Johnson distributor, or write to us.

C. S. JOHNSON Company CHAMPAIGN, ILLINOIS

(Koehring Subsidiary) "CF" J548

New Cotton Group Formed

The American Cotton Producer Associates—the nucleus of what it is hoped will one day become an organization of Beltwide scope—was officially organized at Memphis, Sept. 22.

States represented at the organizational meeting were Arkansas, Louisiana, Mississippi, Missouri and Tennessee.

Nitro-Chemicals Announces Harrisons And Crosfield

Harrisons and Crosfield (Canada) Ltd., has been named exclusive sales agents for the distribution of chemical fertilizers produced by Northwest Nitro-Chemicals, Ltd., is was announced by J. Albert Woods, president. The Company's twenty-two million dollar plant, now under construction at Medicine Hat, Alberta, Canada, is scheduled for completion in the fall of 1956.

International Expands Kraft Paper Capacity

The board of directors of International Paper Company have authorized additions and improvements to the company's Mobile Mill to provide for a new kraft paper machine, it was announced by John H. Hinman, chairman.

This expansion is in addition to the mill's current expansion program announced last Spring. When this expansion program is completed, the Mobile Mill will be the largest mill in the world manufacturing paper, Mr. Hinman said.

Marietta Concrete Builds Lake Charles Silos

A contract for the construction of four precast concrete stave industrial silos has been awarded to The Marietta Concrete Corporation, Marietta, Ohio, by the Harbor and Terminal Commission of Lake Charles, Louisiana, it has been announced by F. Leonard Christy, vice president.

The new silos are 30 feet in diameter and 70 feet in height, and are to be constructed as an addition to an installation of eight silos of the same size that Marietta erected for the Harbor and Terminal Commission last winter. The original installation is being used for the storing and processing of phosphate rock and barytic ore.

Cost of these new silos will total more than $50,000.00 and will provide the shipping terminal with 50 per cent more storage space for the stockpiling of various materials handled through the port.

A Winning Hand . . .

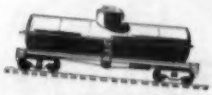
5 PHILLIPS Fertilizer Materials for High Analysis Mixtures

1 Ammonium Sulfate



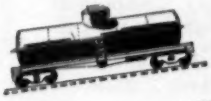
New Premium Quality Phillips *66* Ammonium Sulfate contains 21% nitrogen, 23.8% sulfur. It is *dry*-cured to remove excess moisture, prevent caking. Uniform dust-free crystals flow freely, mix easily. Ideal for all analyses of mixed goods and for direct application. Available in bags or bulk.

2 Anhydrous Ammonia



Phillips *66* Agricultural Ammonia contains 82% nitrogen. It's a convenient, economical source of nitrogen for formulation. Tank car shipments are assured to Phillips contract customers by Phillips huge production facilities in the Texas Panhandle and at Adams Terminal near Houston, Texas.

3 Nitrogen Solutions



Get more N per dollar! There are three Phillips *66* Nitrogen Solutions for use in preparation of high-analysis fertilizers and the ammoniation of superphosphate. These solutions keep handling costs low; help rapid, thorough curing.

4 Ammonium Nitrate



Phillips *66* Prilled Ammonium Nitrate contains 33.5% nitrogen. The small, coated prills or pellets resist caking, handle easily. Depend on Phillips *66* Prilled Ammonium Nitrate for uniform free-flowing properties in formulations and top-notch crop response as a direct application material.

5 Triple Superphosphate



Phillips *66* Triple Superphosphate contains 46% available phosphoric acid. Ideal for use in formulation of high-analysis fertilizers.

Phillips 66

PHILLIPS CHEMICAL COMPANY

A Subsidiary of Phillips Petroleum Company, Bartlesville, Oklahoma

Offices in:

AMARILLO, TEX.—*First Nat'l Bank Bldg.*
BARTLESVILLE, OKLA.—*Adams Bldg.*
CHICAGO, ILL.—*7 South Dearborn St.*
DENVER, COLO.—*1375 Kearney Ave.*
DES MOINES, IOWA—*606 Hubbell Bldg.*
HOUSTON, TEX.—*1020 E. Holcombe Blvd.*
INDIANAPOLIS, IND.—*1112 N. Pennsylvania St.*
KANSAS CITY, MO.—*500 West 39th St.*
MINNEAPOLIS, MINN.—*212 Sixth St. South*
NEW YORK, N. Y.—*80 Broadway*
OMAHA, NEB.—*WOW Building*
PASADENA, CALIF.—*604 Citizens Bank Bldg.*
RALEIGH, N. C.—*804 St. Mary's Ave.*
SALT LAKE CITY, UTAH—*68 South Main*
SPOKANE, WASH.—*521 E. Sprague Ave.*
ST. LOUIS, MO.—*4251 Lindell Blvd.*
TAMPA, FLA.—*1214 South Dale Mabry*
TULSA, OKLA.—*1708 Utica Square*
WICHITA, KAN.—*501 KFH Building*



For your lead requirements!

CHEMICAL AND ANTIMONIAL

sheet lead and lead pipe

Evans Metal Company

Box 97 Northside Station • ATLANTA, GEORGIA • Elgin 4338

Alex. M. McIver & Son

BROKERS

Specializing

SULPHURIC ACID

Ground Cotton Bur Ash, 38/42% K_2O Potash.

Nitrogenous Materials

Castor Pomace

Urea, 45½% and 46% Nitrogen

Calcium Ammonium Nitrate, 20.5% Nitrogen

Representatives

Morgan Brothers Bag Company, Inc.

Bags—Paper and Textile

Ammoniated Base and Superphosphate

Dolomitic Lime
(42-44% Magnesium Carbonate)
(54/56% Calcium Carbonate)

POTASH

PEOPLES OFFICE BUILDING

Charleston **South Carolina**

Phones: 3-4828 and 3-4829

BERKSHIRE

Specialists in

Magnesia for Agriculture

EMJEO (80/82% Magnesium Sulphate)
Calcined Brucite (fertilizer grade) 70% MgO

POTNIT
(95% Nitrate of Potash)
for
Special Mixtures and Soluble Fertilizers
Other Fertilizer Materials

INSECTICIDES — FUNGICIDES
Mercury Compounds
for Agricultural Use

DITHIOCARBAMATES
Ferric — Zinc

EXPORT - IMPORT

BERKSHIRE CHEMICALS, INC.

420 Lexington Avenue, New York 17, N. Y.
55 New Montgomery St., San Francisco 5, California
Cable Address — "Berkskem" New York



REPRESENTATIVE ANALYSIS

Calcium content —$CaCo_3$ value	52.47%
Magnesium content —$CaCo_3$ value	44.23%
Calcium Carbonate —Equivalence	96.70%

MAGNESIUM LIMESTONE

EACH TON OF MASCOT LIMESTONE
CONTAINS ABOUT

3.6 Lbs. Zinc **.75 Lbs. Manganese**
4.8 Lbs. Sulphur **.05 Lbs. Copper**

American Limestone Co.

Box 2389 **Knoxville, Tenn.**

CLASSIFIED ADVERTISING

FERTILIZER PLANT—CHEMICAL PLANT located 50 miles from Minneapolis. Rich farming area. Ideally equipped for conversion to manufacturing liquid fertilizers. The price is right. Box 27, c/o Commercial Fertilizer, 75—3rd St., N.W., Atlanta, Ga.

LULING, TEXAS

This South Texas city presents unusual opportunity for establishment of Manufacturing or Distribution center Farm Chemicals and Commercial Fertilizer. Well situated relative agricultural areas of state and well located on railroad and trunk line highways. Attractive tax and utility rates. Healthy labor conditions. Inquiries invited. Luling Chamber of Commerce, Luling, Texas.

FOR SALE BY: Southern States Phosphate & Fertilizer Co. P. O. Box 546, Savannah, Ga. One Mills Packard Chamber Steel Tower, 40' high x 27'-3" I. D. at base, x 19'-2" I. D. at top, with hand rails and walkways. In excellent condition. Can ship promptly.

POSITION WANTED: Have had 14 years experience as assistant superintendent and general foreman in two large plants. Interested in locating in Southeastern area. J. G. McArthur, 550 Oak Ave., Americus, Ga.

WANTED: PLANT SUPERINTENDENT — Production Man with experience in manufacture of high analysis pelleted fertilizers, capable of entire plant operation. Opportunity for advancement with progressive, well established company in southwest. Reply in own handwriting stating personal information, past experience and other qualifications. Address replies to Box 35, c/o Commercial Fertilizer, 75—3rd St., N.W., Atlanta, Ga.

WANTED—FOREMAN Experienced, full charge of mixing in a small ammoniating plant located in a Northern Mid-Atlantic state. Box #29, c/o Commercial Fertilizer, 75—3rd St., N. W. Atlanta, Ga.

FOR SALE: Dry Mixing Fertilizer Plant. Good condition. Capacity 15,000 tons. Located in North Alabama; two railroads, Tennessee River, seven paved highways, paved farm to market roads. Well established trade. Box #28, c/o Commercial Fertilizer, 75 Third St., N. W., Atlanta, Georgia.

FOR SALE: (3) 23,400 gal. Horiz. Welded Steel Tanks, (2) 14,100 gal. Horiz. Welded Glass Lined Steel Tanks. (4) 15,000 gal. Vertical Welded Steel Tanks with coils. (12) 3,000 gal. Horiz. Aluminum Tanks. (5) Rotary Kilns and Dryers: 10'6" D x 105', 6' x 50', 5' x 30', 4'6" x 40', 3' x 25'. Also Pulverizers, Mixers and Conveying Equipment. Perry Equipment Corp. 1426 N. 6th St., Philadelphia 22, Pa.

WANTED: POSITION AS SUPERINTENDENT DRY MIXING OR ACIDULATING PLANT IN SOUTH ONLY. Box 33, c/o Commercial Fertilizer, 75—3rd St., N.W., Atlanta, Ga.

ANYONE WITH ANY IDEAS FOR USE OF BRICK STORAGE WAREHOUSE AND LARGE 60 x 300 YARD SPACE WITH MY SERVICES. LOCATED EASTERN NORTH CAROLINA. Box 32, c/o Commercial Fertilizer, 75—3rd St., N.W., Atlanta, Ga.

CHEMICAL ENGINEERS

AGRONOMISTS

AGRICULTURAL ENGINEERS

Established, nationwide firm needs two Technical Service Representatives.

One position requires a man thoroughly familiar with the storage and applications of

ANHYDROUS AMMONIA

and ammonia nitrate to provide technical service to customers in the Mid-West and Rocky Mountain areas. Other position requires experience in the uses and handling of—

PITCH

and other coal tar products for eastern location. Both positions require some travel.

Submit full resume including salary requirements.

All replies held confidential. Box #36, c/o Commercial Fertilizer, 75—3rd St., N.W. Atlanta, Ga.

WANTED: Job as Plant Superintendent. More than 25 years experience. Am now employed but have good reason for desiring change. Write Box 34, c/o Commercial Fertilizer, 75—3rd St., N. W., Atlanta, Ga.

FOR SALE: Two used Exact Weight bagging scales, thoroughly cleaned, painted and in excellent mechanical condition. Johnson Cotton Company, Wilmington, North Carolina.

FOR SALE: Two (2) Two-ton U. S. Model 104 Superphosphate Mixers, Two Dust Scales, Two Acid Scales, One Atlanta Utility 1-½ Ton Batch Mixer. All used but good condition. Write Southern Fertilizer & Chemical Co., P. O. Box 1158, Savannah, Ga.

WANTED: Used one ton Stedman mixer; Hammermill, bagging equipment, and other Fertilizer mixing equipment. HY-YIELD SOIL SERVICE, 514 Walnut St., Murphysboro, Illinois.

NEW PETROCHEMICAL COMPANY Now in Agricultural Chemicals. We are seeking an ambitious, energetic individual who wants to grow with us. He should: Have a strong background on ammoniating and bulk plant mixing technology. Be a Chemical Engineer or equivalent well acquainted in Southeastern States. Be able to supply technical advice and accompany sales personnel on customer contacts. Be qualified as a company representative meeting State and University Agricultural organizations. Please furnish complete resume of personal data, education and experience to Box #37, c/o Commercial Fertilizer, 75—3rd St., N.W., Atlanta, Ga.

FOR SALE: Rotary Dryers 5′ x 30′, 5′ x 40′, 4′6″ x 50′, 5′ x 67′, 6′ x 60′, 9′ x 80′. (1) Pressure Tank 13,000 gal. 220#. Also Mixers, Storage Tanks, Screens, Elevators. Send us your inquiries. Brill Equipment Company, 2402 Third Ave., New York 51, N. Y.

SITUATION WANTED: Capable, alert young man, M.S. in Agronomy, age 32, married, extensive experience in agricultural field, desires opportunity with progressive concern. Technical, liaison, sales position preferred. Reply Box #31, c/o Commercial Fertilizer, 75—3rd St., N. W., Atlanta, Ga.

LAW & COMPANY
Founded 1903
FERTILIZER CHEMISTS
Three Convenient Laboratories
P. O. Box 1558 Atlanta, (1) Ga. | P. O. Box 789 Montgomery, Ala. | P. O. Box 629 Wilmington, N. C.

Serving the
FERTILIZER INDUSTRY
Fertilizer Equipment Sales Corp.
Designers — Engineers — Manufacturers of Fertilizer Machinery
Sales and engineering office: P. O. Box 1968, 130 Krog St., N. E., Atlanta, Ga. Phone Cypress 6615
Manufacturing plant: P. O. Box 67, 1610 Kentucky St., New Orleans, La. Phone Bywater 8373

STATEMENT OF OWNERSHIP, ETC.
OF
COMMERCIAL FERTILIZER
AS OF OCTOBER 1, 1955

1. *Publisher, editor, etc.:*
Publisher: Walter W. Brown Publishing Co., Inc., 75 Third St., N.W.
Editor: Bruce Moran, 75 Third St., N.W.
Business Manager: V. T. Crenshaw, 75 Third St., N.W.
2. *Owner (if corporation, name of corporation, and immediately below the names of all stockholders owning 1% or more of stock):*
Walter W. Brown Publishing Co. Inc., 75 Third St., N.W.
Ernest H. Abernethy, 75 Third St., N.W.
Virginia T. Crenshaw, 75 Third St., N.W.
3. *Bondholders, mortgages, etc.:*
None.

Signed: ERNEST H. ABERNETHY, *President*

Sworn to and subscribed before me, a Notary Public, this 24th day of September, 1955.

MARY C. LAYMAN, *Notary Public.*
My commission expires March 17, 1956.

Southern Steel Equip. Co.
936 Adamson St. SW
Atlanta, Ga.
Phone WAlnut 5813

FABRICATORS
of
Steel and Stainless Steel Tanks
Rotary Fertilizer Dryers & Coolers
Batching Hoppers
Dust Handling Equipment

Wiley & Company, Inc.
Analytical and Consulting Chemists
Calvert & Read Streets
BALTIMORE 2, MD.

SHUEY & COMPANY, INC.
Specialty: Analysis of Fertilizer Materials and Phosphate Rock. Official Chemists for Florida Hard Rock Phosphate Export Association. Official Weigher and Sampler for the National Cottonseed Products Association at Savannah; also Official Chemist for National Cottonseed Products Association.
115 E. Bay Street, Savannah, Ga.

Cut Production Costs—
Speed up your plant with
ATLANTA UTILITY
FERTILIZER MACHINERY
Fertilizer Mixing Systems
Revolving Screens
Mixing Plows
Clod Breakers
Elevators
Fertilizer Shakers
Cage Mills
Batch Mixers
Write Today for Descriptive Folder
ATLANTA UTILITY WORKS
EAST POINT, GA.

SOUTHERN STATES PHOSPHATE and FERTILIZER CO.
SAVANNAH, GEORGIA
Manufacturers of SULPHURIC ACID, SUPERPHOSPHATE, COMPLETE FERTILIZERS and ALL TYPES OF BASE GOODS
EXPORT ORDERS SOLICITED

Put your Shipping Sack on your Sales Team



....with attractively designed brands and brilliant multi color printing by HAMMOND

Hammond Betterbags

Hammond Multi-Walls

"TREES ARE A CROP"

Outstanding in appearance and durability . . . Hammond Multi-Wall bags create enthusiasm and pride among your sales representatives . . . help to increase sales through distributors and dealers . . . build prestige for your company and products, and provide complete protection of contents from packing machines to the ultimate consumer. Yes, you can put your shipping sack on your sales team by specifying Hammond Multi-Walls.

For Multi-Wall Bags,
"Make it a Habit to Depend on Hammond"

HAMMOND BAG & PAPER COMPANY, INC.

General Offices: Wellsburg, W.Va.
Plants in Wellsburg, W. Va., Pine Bluff, Ark., Charlotte, N. C. and Palatka, Fla.

Representatives in the following cities: NEW YORK, N. Y., CHICAGO, ILL., MINNEAPOLIS, MINN., KANSAS CITY, MO., CLEVELAND, OHIO, ATLANTA, GA., WASHINGTON, D. C., DALLAS, TEXAS, CHARLOTTE, N. C., LIGONIER, PA., BLUEFIELD, VA.

BANK HOLDS SOILS AND FERTILIZER MEETING

The Pulaski County Bank at Richland, Missouri recently held a meeting on soils and fertilization for farmers. Two speakers were featured on the program; Mr. John Falloon, Extension Soils Specialist of the University of Missouri, College of Agriculture, and Mr. Perry Onstot, Davison Chemical Company, Division of W. R. Grace & Company, Joplin, Missouri. The speakers discussed the various aspects of soil fertility and plant nutrition and conducted a question and answer period following their discussion.

The soils meeting was one of a series of Farm Forum meetings conducted by the Bank in the interests of better farming. Mr. Gordon Warren of the Pulaski County Bank, who made the arrangements for the meeting, announced that the meetings were offered as a public service feature by the Bank to help keep farmers in that area informed and to assist in any way possible in providing farmers with an opportunity to hear and discuss timely farm topics.

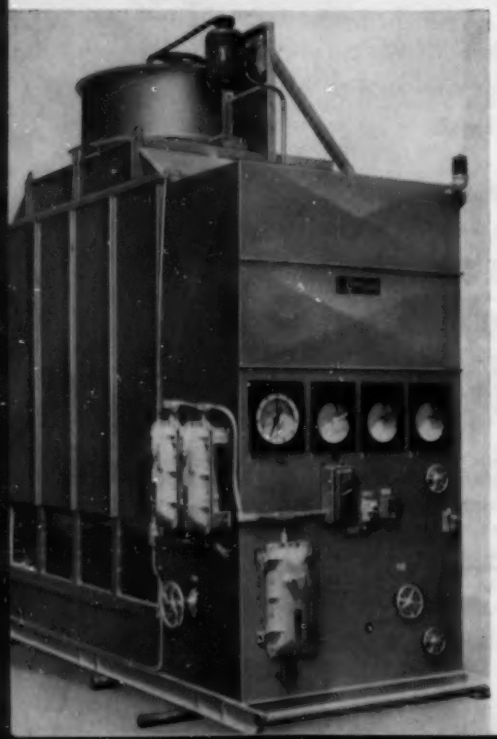
The meetings were held in the air conditioned facilities of the Pulaski County Bank and there were approximately 150 persons in attendance for each meeting. Light refreshments were served to all guests at the close of each meeting and a door prize was awarded each night.

Other meetings and speakers in the series included; "The Farm Social Security Law", Mr. Hiram Ford, Social Security Field Office, Jefferson City, Missouri, and "Agricultural Outlook and Livestock Marketing", Dr. Lawrence E. Kreider, Agricultural Economist of the Federal Reserve Bank of St. Louis, and Mr. Paul Woodson, President, Woodson and Fennewald, National Stockyards, Ill.

Oklahoma Bulletin To Bankers Welcomed

The Oklahoma extension forces are working on their bankers to "Know Your Fertilizer." A series of mailings has gone out, and been welcomed. The most recent of these discuss the fertilization of small grains in that state.

This new portable ammonia converter is the largest of its kind, engineered and manufactured for Nickel Processing Corp., Nicaro, Cuba. It was built by the J. C. Carlile Corporation, Denver, Colorado who have developed and are producing a line of portable ammonia converters for the production of aqueous ammonia wherever desired. Efficiency of these units is unusually high—approaching 100%. Construction is simplified and cost is therefore low. Additional information can be secured from the J. C. Carlile Corp., 425 Cooper Bldg., Denver 2, Colo.



Spencer Men Develop N Injection Nozzles

Fertilizer manufacturers will be interested in a complete line of nozzles for injecting nitrogen solutions, anhydrous ammonia and acids separately or in combinations which has been developed by Thackston-Davis Supply Company, Columbia, South Carolina.

The injection nozzles are refinements of a basic single-manifold design developed by H. B. Davis, Spencer Chemical Company's South Carolina sales representative. By injecting ammoniating solutions approximately one inch from the mixer flights they provide better ammoniation than can be obtained from conventional spray pipes. By deflection and diffusion, solutions are brought into intimate contact with the superphosphates and potash. From four to eight nozzles are used, depending on the size of the mixer.

Bill W. Threadgill, of Spencer Chemical Company's technical service staff, has designed an automatic trip modification which provides for an adjustable stabilizing bar to allow placement of the "DID" nozzles as required.

Jeffrey Adds New Conveyors

The addition of a light weight mechanical vibrating conveyor to its line of conveying equipment has been announced by The Jeffrey Mfg. Co. of Columbus, Ohio, to meet the growing demand for inexpensive, dependable and low maintenance conveying. The LMV light weight units are fully described and pictured in Catalog No. 890 which can be had upon request from the manufacturer.

Suspension Scales Brochure Issued

The Webb Corporation, Webb City, Missouri, has just released an attractive and informative four-page folder on their various types of Suspension hopper scales which are widely used for mixing, proportioning or batching.

The scales are all steel construction, featuring hardened steel pivots and bearings (self-aligning). The scales can be equipped with dial indicators or with weigh beams as desired. The new brochure describes and illustrates a wide variety of styles and sizes of industrial scales and will be sent free on request.

American Wheelabrator Changes Corporate Name

American Wheelabrator & Equipment Corp., Mishawaka, Indiana announces that it has changed its corporate name to Wheelabrator Corporation, effective immediately. The move does not involve any alteration in the ownership, management, or operation of the company, which manufactures blast cleaning equipment, dust and fume control equipment, and foundry equipment.

Stephens-Adamson Mfg. Co. Opens Dallas Warehouse

The Stephens-Adamson Mfg. Co., Standard Products Division, announces the opening of a new warehouse at 5623 Dyer Street, Dallas, Texas. The new facilities will enable the company to better service accounts in the sowthwest with their stock line of conveyor machinery and accessory equipment. Ready for immediate shipment from the Dallas warehouse will be belt conveyor machinery, box car loaders and pilers, car pullers, winches, speed reducers and allied items.

The company's Standard Products Division is represented in Texas and Oklahoma by General Power Equipment Co., 5623 Dyer St., Dallas.

FIRST in Performance
because it's
FIRST in Design

New Model HA
PAYLOADER®
Tractor Shovel

with 40 degree bucket tip-back and powerful break-out action



FIRST in Digging Capacity
FIRST in Lifting Capacity
FIRST in Carrying Capacity
FIRST in Maneuverability
FIRST in Safety

The 1955 Model HA "PAYOADER" has gone to work in all kinds of manufacturing and processing plants and has already proven that it is a production champion. It has an 18 cu. ft. bucket — the biggest capacity in its class — and an amazing new bucket action. Long-time "PAYLOADER" users as well as new owners report new highs in production and new lows in bulk-material handling costs with the new HA.

They praise the 40 degree bucket tip-back at ground level that digs heaped bucket loads easily — up to a ton in weight — and carries them close and low for fast, safe transport without spillage. They like the increased power, the ease and speed of operation that comes from torque converter drive, easy steering and powerful hydraulic brakes.

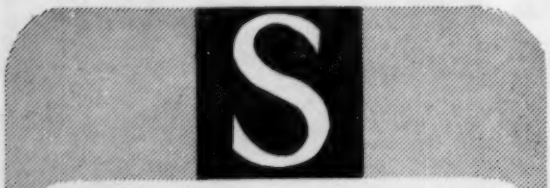
Your PAYLOADER Distributor is ready to show what the new HA can do on *your* bulk-material handling work.

☐ Send data on Model HA (18 cu. ft. bucket capacity)
☐ On larger 2-wheel drive models
☐ On larger 4-wheel drive models
☐ On "PAYLOADER" towing tractors

Name .....
Title .....
Company .....
Street .....
City .....
State .....

cf

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY INTERNATIONAL HARVESTER COMPANY



STEDMAN

FERTILIZER PLANT EQUIPMENT

Established in 1834

All Steel Self-Contained Fertilizer Mixing and Bagging Units

Batch Mixers — Dry Batching
Pan Mixers — Wet Mixing

Tailings Pulverizers – Swing Hammer and Cage Type

Vibrating Screens **Dust Weigh Hoppers**

Acid Weigh Scales **Batching Hoppers**

Belt Conveyors — Stationary and Shuttle Types

Bucket Elevators **Hoppers and Chutes**

STEDMAN FOUNDRY & MACHINE COMPANY, INC.
Subsidiary of United Engineering and Foundry Company
General Office & Works: AURORA, INDIANA

INDEX TO ADVERTISERS

Abrasion and Corrosion Engineering Co. 17
Agricultural Extension Section, United States Steel Corp. .....
Albemarle Paper Manufacturing Company 11
Allied Chemical & Dye Corporation (Nitrogen Div.) ..... Front Cover
American Agricultural Chemical Company, The ..... Inside Front Cover
American Limestone Co. 58
American Potash & Chemical Corporation 13
American Vermiculite Company, Inc. .....
Arkell Safety Bag Company 15
Arkell and Smiths 49
Armour Fertilizer Works 10
Ashcraft-Wilkinson Co. ..... 14-Back Cover
Atlanta Utility Works 60

Bagpak Division (International Paper Co.) .....
Bemis Bro. Bag Co. 43
Berkshire Chemicals, Inc. 58
Blaw-Knox (Equipment Division) .....
Blue Valley Equip. Mfg. & Engr. Co. 54
Bradley & Baker (U. S. Phosphoric Products) 31

Chantland Mfg. Company 55
Chase Bag Company .....
Chicago Fertilizer Co. 55
Cole Manufacturing Co., R. D. .....
Commercial Solvents Corporation .....

Davidson-Kennedy Co. 5
Deere & Co. (Grand River Chemical Div.) .....
Duval Sulphur and Potash Co. 14

Evans Metal Company 57
Exact Weight Scales Company, Inc. 12

Fertilizer Equipment Sales Corp. 60
Fulton Bag & Cotton Mills .....

General American Transportation Corporation 8
Grace Chemical Company .....
Grand River Chemical Division, Deere & Co. .....

Hammond Bag & Paper Company 61
Harte Company, John J. 7
Hough Co., The Frank G. 63
Hudson Pulp & Paper Corp. .....

International Minerals & Chemical Corporation
Phosphate Chemicals Division 33
Phosphate Minerals Division 18
Potash Division .....
International Paper Company (Bagpak Div.) .....
Johnson Company, C. S. 56

Keppers Company, Inc. (Tar Products Div.) .....
Kraft Bag Corporation .....
Lancaster, Allwine & Rommel 55
Law & Company 60

Link-Belt Company 60
Lion Oil Company, A Division of Monsanto Chemical Co. 3

McIver & Son, Alex. M. 55-58
Midstate Machinery Company 36

National Lime and Stone Co., The .....
Nitroform Agricultural Chemicals Division
Woonsocket Color & Chemical Co. 9
Nitrogen Division (Allied Chemical & Dye Corp.) ..... Front Cover

Phelps Dodge Refining Corp. .....
Phillips Chemical Company 57
Potash Company of America ..... Inside Back Cover

Quaker Oats Company, The (Chemicals Dept.) 55

Raymond Bag Company, The 53
Renneburg & Sons Co., Edw. 38

Sackett and Sons Co., The A. J. 44
St. Regis Paper Company, Multiwall Bag Division 35
Shuey & Company, Inc. 60
Simplicity Engineering Company 16
Smith-Rowland Company .....
Sohio Chemical Co. 46
Southern Lead Burning Co. 55
Southern States Phosphate and Fertilizer Co. 60
Southern Steel Equip. Co. 60
Spencer Chemical Company 37
Stedman Foundry & Machine Company, Inc. 64
Sturtevant Mill Company 51

Tennessee Corporation 52
Texas Gulf Sulphur Co. 4
Tull Metal & Supply Co., Inc., J. M. .....

Union Bag & Paper Corporation .....
Union Special Machine Co. .....
U. S. Phosphoric Products Division, Tennessee Corp. 31
United States Potash Company, Inc. 39
United States Steel Corp. (Coal Chemical Sales Div.) .....

Virginia-Carolina Chemical Corporation .....

Weatherly Company, The D. M. 29
Wiley & Company, Inc. 60
Willingham-Little Stone Company .....
Woodward & Dickerson, Inc. 17

THE DOWD PRESS INC., CHARLOTTE, N. C.



ANOTHER GIANT SERVANT OF AGRICULTURE

Now there's a *new* giant servant . . . PCA's new giant ore bin, more than 1,000 feet underground, the *only* underground ore bin in North America with a rotary plow feeder.

Specially designed by PCA's engineers, planned by the PCA team, this bin and its revolutionary feeder will smooth and increase the flow of ore for the production of the potash that serves American agriculture.

P.C.A.
The SALT of the EARTH
RED MURIATE

POTASH COMPANY OF AMERICA

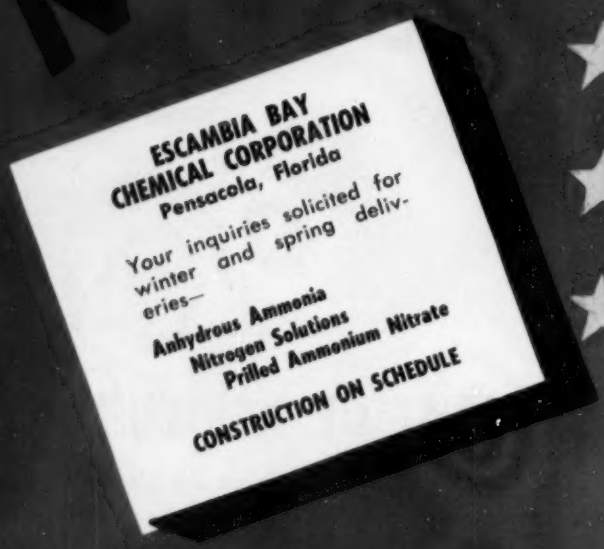
CARLSBAD, NEW MEXICO.

General Sales Office . . . 1625 Eye Street, N.W., Washington, D.C.
Midwestern Sales Office . . . First National Bank Bldg., Peoria, Ill.
Southern Sales Office . . . Candler Building, Atlanta, Ga.

FERTILIZER MATERIALS

FOREIGN AND DOMESTIC

- NITROGEN COMPOUNDS
- SULPHUR & POTASH
- ORGANIC AMMONIATES
- INSECTICIDAL AND INDUSTRIAL CHEMICALS



VEGETABLE OIL MEALS & FEEDSTUFFS

EXCLUSIVE DISTRIBUTORS
DUVAL SULPHUR AND POTASH COMPANY
ESCAMBIA BAY CHEMICAL CORPORATION

ASHCRAFT-WILKINSON CO.

Home Office
ATLANTA, GEORGIA

Cable Address
ASHCRAFT

Norfolk, Va.
Charleston, S. C.

Tampa, Fla.

Jackson, Miss.
Columbus, Ohio